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Astronomische

TAFELN und FORMELN.

Herausgegeben

von

Dr. *C. F. W. Peters,*

Assistent der Sternwarte in Altona.

HAMBURG.

WILHELM MAUKE.

1871.

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Vorrede.

Die im Jahre 1822 von *Schumacher* und im Jahre 1845 von *Warnstorff* herausgegebenen astronomischen Hülfstafeln haben sich einer so allgemeinen Anwendung zu erfreuen gehabt, dass es wohl gerechtfertigt erscheinen mag, wenn jetzt, nachdem beide Sammlungen seit längerer Zeit im Buchhandel vergriffen sind, eine Tafel ähnlicher Art erscheint. Da nun auch besonders von Reisenden häufig Nachfrage nach den erwähnten Büchern geschieht, worin sie eine bequeme Zusammenstellung der zur Reduction ihrer astronomischen Beobachtungen gebräuchlichen Tafeln und Formeln finden; da ferner in der *Warnstorff*'schen Sammlung manche Tafeln fehlen, die der Astronom häufig anzuwenden hat, dafür aber andere hineingekommen sind, die fast nie gebraucht werden, und überdiess das Buch durch eine grosse Anzahl von Druckfehlern entstellt wird, so entschloss ich mich zur Herausgabe einer neuen Sammlung, die, wie ich glaube, manche Verbesserungen gegen die früheren enthält. Es sind namentlich hineingefügt eine bei Berechnung der Refraction gebrauchte Tafel von $\log \alpha \operatorname{tg} z$, von Minute zu Minute der Zenithdistanz berechnet, eine Tafel der Reduction der geographischen auf die geocentrische Polhöhe und des Radius Vectors für verschiedene Polhöhen, eine Hülfstafel für die Parallaxenrechnung, die Reduction der Zeit auf das *Bessel*'sche Jahr, Interpolationstafeln, Tafeln der trigonometrischen Function, Quadratzahlen, die *Rühlmann*'schen hypsometrischen Tafeln; andere sind gegen die bei *Warnstorff* erheblich verändert, und eine grosse Zahl ganz weggelassen. Hierbei erwähne ich besonders der Tafel zur Verwandlung des Stundenwinkels und der Declination in Azimuth und Höhe für die Polhöhe der Altonaer Sternwarte, die das Buch für alle an andern Orten wohnenden Astronomen nur in unnöthiger Weise ausdehnt; ich habe statt dieser Tafeln die Formeln zu ihrer Berechnung an den Schluss des zweiten Theiles gebracht, wonach Jeder leicht in den Stand gesetzt wird, sich für seinen Beobachtungsort die Tafel selbst zu berechnen.

Altona, im September 1871.

C. F. W. Peters.

Berichtigungen.

S. 5. Z. 21 v. u. statt .9 lies 1.9.

S. 23 steht als Seitenzahl 32.

S. 58 u. 59. Columne 3, statt log ϱ' lies log ϱ.

S. 170. Z. 4 v. o. statt $(t+t'=2c)$ lies $(t'+t'')=2c$.

S. 171. Taf. II. Z. 2 v. o. statt $x=45^\circ-\varphi$ lies $x=45^\circ-\psi$.

Inhalt.

I. Tafeln.

Tafeln zur Verwandlung der mittleren Zeit und Sternzeit. I. . . . . S. 2.
II. . . . . » 15.
Tafel zur Verwandlung der Decimaltheile des Tages in Stunden, Minuten und Secunden, und umgekehrt . . . . . » 16.
Tafel zur Verwandlung des Bogens in Zeit . . . » 18.
Tafel zur Verwandlung der Zeit in Bogen . . . » 19.
Tafel für die Länge der Kreisbögen, Halbmesser = 1 gesetzt . . . . . » 20.
Tafel der mittleren Refraction . . . . . » 22.
Refractionstafel nach *Bessel*. I. . . . . » 24.
II. . . . . » 42.
III. . . . . » 43.
IV. . . . . » 44.
V. . . . . » 51.
Tafel für die Gestalt der Erde . . . . . » 53.
Hülfstafel für die Parallaxenrechnung . . . . . » 58.
Tafel zur Reduction auf den Meridian . . . . » 60.
Tafel der Logarithmen von m und n . . . . » 72.
Tafel für die Mittagsverbesserung . . . . . » 89.
Tafel für die Mitternachtsverbesserung . . . . » 92.
Reduction der Zeit auf das *Bessel*'sche Jahr . . » 95.
Tafel der mittleren Rectascension der Sonne . . » 96.
Horizontalparallaxe der Sonne, nach *Leverrier* . » 97.
Allgemeine Tafeln für die Aberration. I. . . . » 98.
II. . . . » 99.

Allgemeine Tafel für die Nutation . . . . . S. 100.
Allgemeine Tafel für die Solarnutation . . . . » 102.
Interpolationstafel. I. . . . . » 103.
II. . . . . » 104.
Trigonometrische Functionen . . . . . » 106.
Quadrate der Zahlen von 1 bis 10000 . . . . » 151.
Hypsometrische Tafeln von *Rühlmann* mit Anwendung von Logarithmen . . . . . » 170.
Hypsometrische Tafeln von *Rühlmann* ohne Anwendung von Logarithmen . . . . . » 174.
Siedepunct des Wassers bei verschiedenen Barometerständen . . . . . » 178.
Reduction des altfranzösischen Barometers . . . » 179.
Reduction der Barometerhöhen in Millimetern . » 182.
Reduction des Englischen Barometers . . . . » 184.
Reduction des altfranzösischen Barometers mit zwei Thermometern . . . . . » 192.
Verwandlung der Barometer- und Thermometerscalen . . . . . » 199.

II. Formeln.

Goniometrische Formeln . . . . . » 204.
Trigonometrische Formeln . . . . . » 208
Astronomische Reductionsformeln . . . . . » 211.
Passagen-Instrument im Meridian . . . . . » 211.
Passagen-Instrument im Verticale des Polarsterns » 213.
Passagen-Instrument im ersten Vertical . . . » 214.
Höhen-Instrumente . . . . . » 215.
Einige andere Reductionsformeln . . . . . » 216.

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Einleitung.

Die Tafel auf S. 2 — 14 enthält die Reduction, die an die Sternzeit anzubringen ist, um mittlere Zeit zu erhalten; die Zehntel der Secunden werden direct aus der Tafel genommen, die Hundertstel finden sich auf jeder ungeraden Seite in der kleinen Tafel am Rande. Es sei z. B. $6^h\,7^m\,16^s.53$ Sternzeit in mittlere Zeit zu verwandeln, so findet sich auf S. 5 die Reduction

für $6^h\,6^m\,51^s$	-1^m	$0^s.1$
» $25^s.53$ . .	—	0.07
Reduction =	-1^m	$0^s.17$;
dieselbe angebracht an	$6^h\,7^m$	$16^s.53$,
giebt für die mittlere Zeit	$6^h\,6^m$	$16^s.36$.

Die Tafel kann ebenfalls zur umgekehrten Aufgabe, der Verwandlung der mittleren Zeit in Sternzeit, benutzt werden; in diesem Falle muss die Reduction auf Sternzeit noch durch die kleine, auf den geraden Seiten befindliche Tafel verbessert werden. Es sei $6^h\,6^m\,16^s.36$ mittlere Zeit in Sternzeit zu verwandeln. Man findet die Reduction auf S. 5

für $6^h\,6^m\,15^s$	$+1^m$	$0^s.0$
1.36		0.00
Pag. 4 giebt für $0^m\,37^s$ die Correction	+	0.10
Pag. 5 für 23^s noch	+	0.06
Reduction =	$+1^m$	$0^s.16$;
diese angebracht an	$6^h\,6^m$	$16^s.36$,
giebt für die Sternzeit	$6^h\,7^m$	$16^s.52$.

Zur genaueren Berechnung der Reduction, auf 4 Decimalen, dient Tafel II. auf S. 15. Die Tafel ist eingetheilt in Stunden, Minuten, Secnnden und Bruchtheile der Secunden; von den drei ersten Abtheilungen dient die erste Columne zur Verwandlung der mittleren Zeit in Sternzeit, die zweite zur Verwandlung der Sternzeit in mittlere; die vierte ist für beide Verwandlungen gemeinschaftlich.

Es soll verwandelt werden

$6^h\,6^m\,16^s.3606$ mittlere Zeit in Sternzeit.

6^h	giebt als	Reduction	. .	$59^s.1388$
6^m	»	»	» . .	0.9857
16^s	»	»	» . .	0.0438
0.3606	»	»	» . .	0.0010

Reduction = $+\ 1^m\ 0^s.1693$

$6^h\,6^m\,16.3606$

$6^h\,7^m\,16^s.5299$ Sternzeit.

Ebenso $6^h\,7^m\,16^s.5300$ Sternzeit in mittlere Zeit.

6^h	giebt als	Reduction	. .	$58^s.9774$
7^m	»	»	» . .	1.1468
16^s	»	»	» . .	0.0437
0.5300	»	»	» . .	0.0015

Reduction = $-\ 1^m\ 0^s.1694$

$6^h\,7^m\,16^s.5300$

$6^h\,6^m\,16^s.3606$ mittl. Zeit.

Die folgenden Tafeln, S. 16 u. 17 Tafel zur Verwandlung der Decimaltheile des Tages in Stunden, Minuten und Secunden, und umgekehrt;

S. 18 Tafel zur Verwandlung des Bogens in Zeit,

S. 19 Tafel zur Verwandlung der Zeit in Bogen,

S. 20 u. 21 Tafel für die Länge der Kreisbögen, Halbmesser = 1 gesetzt.

S. 22 u. 23 Tafel der mittleren Refraction bedürfen wohl keiner Erklärung.

S. 24 bis 52 enthalten die von *Bessel* in den Tab. Reg. gegebenen Refractionstafeln, indessen weiter ausgedehnt und für den Gebrauch bequemer hergestellt. Es ist nach *Bessel* der Logarithmus der Refraction, wenn z die Zenithdistanz bezeichnet,

$$= \log \alpha \operatorname{tg} z + A\,(\log B + \log T) + \lambda \log \gamma.$$

Tafel I. giebt für die scheinbare Zenithdistanz als Argument den Werth $\log \alpha \operatorname{tg} z$, Tafel II. mit demselben Argumente A nnd λ, Tafel III. $\log T$ mit dem Argumente der Grade, die das Thermometer am Barometer angiebt; Tafel IV. $\log B$ mit dem Argumente des Barometerstandes und Tafel V $\log \gamma$ mit dem Argumente der Grade der Lufttemperatur.

Es folgt

S. 53 — 57 Tafel für die Gestalt der Erde nach *Bessel*'s Erddimensionen, entnommen aus dem Berliner Jahrbuche für 1852;

S. 58 — 59 Hülfstafel für die Parallaxenrechnung.

Die Berechnung der Parallaxe geschieht mit Hülfe folgender Formeln:

Bezeichnet:

α die AR für den Mittelpunct der Erde,
δ die Declination für den Mittelpunct der Erde,
α' die AR für den Beobachtungsort,
δ' die Declination für den Beobachtungsort,
φ' die geocentrische Polhöhe,
ϱ den Radius Vector des Beobachtungsortes,
Δ den Abstand des beobachteten Gestirnes von der Erde,
μ die Sternzeit der Beobachtung,
π die Horizontalparallaxe der Sonne (= 8″809 nach *Leverrier*), so ist

$$\alpha = \alpha' + \pi\varrho \cos\varphi' \sin(\mu - \alpha') \sec\delta' \cdot \frac{1}{\Delta}$$

$$\delta = \delta' + [\pi\varrho \sin\varphi' \cos\delta' - \pi\varrho \cos\varphi' \cos(\mu - \alpha') \sin\delta'] \frac{1}{\Delta};$$

oder, wenn man setzt

$$\operatorname{tg}\gamma = \frac{\operatorname{tg}\varphi'}{\cos(\mu - \alpha')}$$

$$\delta = \delta' + \frac{\pi\varrho \sin\varphi' \sin(\gamma - \delta')}{\sin\gamma} \cdot \frac{1}{\Delta}$$

In der Tafel auf S. 58 u. 59 sind nun für die Hauptsternwarten die Werthe

φ', $\log\varrho$, $\log\pi\varrho\cos\varphi'$, $\log\pi\varrho\sin\varphi'$, $\log\operatorname{tg}\varphi'$

angegeben. In der letzten Columne findet sich unter der Bezeichnung s die häufig gebrauchte Grösse, welche an die Sternzeit im mittleren Mittag, wie sie im Berliner Jahrbuche angegeben, anzubringen ist, um die Sternzeit im mittleren Mittage für andere Orte zu erhalten. Es ist dies die Grösse

$$\frac{236^s.555}{24} l = 9^s.8565\, l,$$

wo l die in Stunden ausgedrückte westliche Länge von Berlin bezeichnet. Um sie in Bezug auf andere Meridiane, z. B. Greenwich zu erhalten, braucht man nur den nebenstehenden Werth mit dem für den gewünschten Meridian angegebenen zu verbinden. Es findet sich z. B. die Correction, die an die Sternzeit im mittleren Mittag in Berlin anzubringen ist, für Altona = + 2.269, für

Greenwich $= +8.802$; es wird also, um die Sternzeit im mittleren Mittag von Greenwich auf Altona zu reduciren, an erstere die Correction

$-8.802 + 2.269 = -6.533$ anzubringen sein.

S. 60 — 71. Tafel zur Reduction auf den Meridian.

S. 72 — 88. Tafel der Logarithmen von m und n.

Bezeichnet

φ die Polhöhe,

δ den Abstand des culminirenden Sterns von dem über dem Horizonte befindlichen Durchschnittspuncte des Meridianes mit dem Aequator, so dass für obere Culminationen $\delta =$ Declination, für untere Culminationen $\delta = 180^\circ -$ Declination wird,

z die beobachtete Zenithdistanz, (Polhöhe, Declination und Zenithdistanz positiv, wenn sie nördlich sind, negativ, wenn südlich.)

x die Correction, um die ausser dem Meridiane beobach- Zenithdistanz auf die Zenithdistanz zu reduciren, so dass Zenithdistanz im Meridian $= z + x$,

so ist

$$x = -\frac{\cos\varphi\cos\delta}{\sin(\varphi-\delta)} . m + \left(\frac{\cos\varphi\cos\delta}{\sin(\varphi-\delta)}\right)^2 . \operatorname{cotg}(\varphi-\delta) . n$$

oder strenge

$$\sin\tfrac{1}{2}x = -\frac{\cos\varphi\cos\delta\sin\tfrac{1}{2}t^2}{\sin(\varphi-\delta+\tfrac{1}{2}x)}.$$

S. 89 — 91. Tafel für die Mittagsverbesserung.

Hat man 2 correspondirende Sonnenhöhen beobachtet, so sucht man aus der Tafel mit der halben Zwischenzeit als Argument $\log A$ und $\log B$. Bezeichnet nun μ den 48stündigen Zuwachs der Declination der Sonne vom vorhergehenden zum folgenden Tage, (μ ist also positiv vom Wintersolstiz bis zum Sommersolstiz und negativ vom Sommersolstiz bis zum Wintersolstiz), so ist die Mittagsverbesserung

$$= -A\mu\operatorname{tg}\varphi + B\mu\operatorname{tg}\delta.$$

S. 92 — 94. Tafel für die Mitternachtsverbesserung.

Die Mitternachtsverbesserung ist

$$= fA\mu\operatorname{tg}\varphi - fB\mu\operatorname{tg}\delta.$$

$\log A$ und $\log B$ findet man aus der Tafel für die Mittagsverbesserung mit dem Supplement der halben Zwischenzeit zu 12 Stunden. Das Argument, mit dem $\log f$ gefunden wird, ist die halbe Zwischenzeit selbst.

S. 95. Reduction der Zeit auf das *Bessel*'sche Jahr.
Es ist dieselbe Tafel, welche in *Wolfers*' »Tabulae Reductionum« auf S. 1 gegeben ist unter dem Titel: »Reductionis diei ad annum fictum pars prima = *k*.«
Ich habe sie nach *Leverrier*'s Sonnentafeln neu berechnet und von 1850 — 1900 ausgedehnt.

S. 96 u. 97. Tafel der mittleren Rectascension der Sonne (Sternzeit im mittleren Mittag) von 1871 bis 1891 für Berlin. Es werde gesucht die Sternzeit im mittleren Mittag für den 29sten August 1871 in Berlin.
Der 29ste August ist der 241ste Tag des Jahres.

Epoche	$18^h\ 38^m\ 41^s.67$
Bewegung und Solarnutation für 240 Tage	15 46 13.31
Bewegung für 1 Tag	3 56.55
Nutation	0.00
Mittlere AR der Sonne für Berlin	$10^h\ 28^m\ 51^s.53$

Im Berliner Jahrbuch findet sich $10^h\ 28^m\ 51^s.54$.

S. 97. Horizontalparallaxe der Sonne, nach *Leverrier*, bedarf keiner Erläuterung.

S. 98 u. 99. Allgemeine Tafeln für die Aberration.
Die Aberration in Rectascension ist
$$= -a \sec\delta \cos(\odot + A - \alpha)$$
Erster Theil der Aberration in Declination
$$= -a \sin\delta \sin(\odot + A - \alpha).$$
$\log a$ und A finden sich mit dem Argumente $\odot$ aus der Tafel I.
Der zweite und dritte Theil der Aberration in Decl. wird aus Tafel II. mit den Argumenten $\odot + \delta$ und $\odot - \delta$ genommen.

S. 100 u. 101. Allgemeine Tafel für die Nutation.
Nutation in AR $= -b \operatorname{tg}\delta \cos(\Omega + B - \alpha) + c$.
Nutation in Decl. $= -b \sin(\Omega + B - \alpha)$.

S. 102. Allgemeine Tafel für die Solarnutation.
Solarnutation in AR $= -f \operatorname{tg}\delta \cos(2\odot + F - \alpha) + g$.
Solarnutation in Decl. $= -f \sin(2\odot + F - \alpha)$.
Die von der doppelten Länge des Mondes $= 2\,☾$ und der doppelten Länge des Knotens der Mondbahn $= 2\,\Omega$ abhängigen Glieder der Nutation ergeben sich aus der Tafel für die Solarnutation, wenn man in dieselbe, statt mit $2\odot$, einmal mit $2\,☾$ und dann mit

$2\,\Omega + 180^\circ$ eingeht, und von der Summe der beiden, diesen Argumenten entsprechenden Nutationsresultate den sechsten Theil, oder noch schärfer $\frac{6}{17}$, nimmt. Ebenso findet sich das von $\odot + \pi$ (π = Perigeum der Sonne) abhängige Nutationsglied, wenn man in die Tafel für die Solarnutation mit $\odot + \pi$ eingeht, und von dem erhaltenen Resultate den sechszigsten Theil nimmt. Die von den Argumenten $\odot - \pi$ und $\mathbb{C} - \pi'$ (π' = Perigeum des Mondes) abhängigen Nutationsglieder sowohl für Rectascension als für Declination werden am einfachsten erhalten, wenn man die jährliche Präcession des Sterns in Rectascension und in Declination für das erstere Argument mit $\frac{1}{17}\frac{1}{2}\sin(\odot - \pi)$ und für das zweite mit $\frac{1}{7}\frac{1}{2}\sin(\mathbb{C} - \pi')$ multiplicirt.

S. 103. Interpolationstafel I.

S. 104 u. 105. Interpolationstafel II.

Werden in einer Tafel die Argumente, ihre Functionen und deren Differenzen durch folgendes Schema dargestellt:

Argument	Hauptfunction	I. Diff.	II. Diff.	III. Diff.	IV. Diff.	V. Diff.	VI. Diff.
a_{-3}	u_{-3}	Δu_{-3}	$\Delta^2 u_{-3}$	$\Delta^3 u_{-3}$	$\Delta^4 u_{-3}$	$\Delta^5 u_{-3}$	$\Delta^6 u_{-3}$ ...
a_{-2}	u_{-2}	Δu_{-2}	$\Delta^2 u_{-2}$	$\Delta^3 u_{-2}$	$\Delta^4 u_{-2}$	$\Delta^5 u_{-2}$	
a_{-1}	u_{-1}	Δu_{-1}	$\Delta^2 u_{-1}$	$\Delta^3 u_{-1}$	$\Delta^4 u_{-1}$		
a	u	Δu	$\Delta^2 u$	$\Delta^3 u$			
a_1	u_1	Δu_1	$\Delta^2 u_1$				
a_2	u_2	Δu_2					
a_3	u_2						

so wird für ein Argument a_x die Function

$$u_x = \frac{u_1 + u}{2} + \frac{x - \frac{1}{2}}{1}\Delta u + \frac{x(x-1)}{1.2}\,\frac{\Delta^2 u + \Delta^2 u_{-1}}{2}$$
$$+ \frac{x(x-1)(x-\frac{1}{2})}{1.2.3}\Delta^3 u_{-1}$$
$$+ \frac{(x+1)x(x-1)(x-2)}{1.2.3.4}\,\frac{\Delta^4 u_{-1} + \Delta^4 u_{-2}}{2}$$
$$+ \frac{(x+1)x(x-1)(x-2)(x-\frac{1}{2})}{1.2.3.4.5}\Delta^5 u_{-2}$$
$$+ \frac{(x+2)(x+1)x(x-1)(x-2)(x-3)}{1.2.3.4.5.6}\,\frac{\Delta^6 u_{-2} + \Delta^6 u_{-3}}{2} + \ldots.$$

oder bequemer

$$(1)\ldots\ u_x = u + x\,\Delta u + \frac{x(x-1)}{4}\,(\Delta^2 u + \Delta^2 u_{-1}) + \frac{x(x-1)\,(x-\frac{1}{2})}{6}\,\Delta^3 u_{-1} + \frac{(x+1)\,x\,(x-1)\,(x-2)}{48}\,\Delta^4\,(u_{-1} + \Delta^4 u_{-2})\ldots$$

Die Function u_x lässt sich aber auch auf folgende Weise herleiten:

$$u_x = u + \frac{x}{1}\,\frac{\Delta u + \Delta u_{-1}}{2} + \frac{x^2}{1.2}\,\Delta^2 u_{-1} + \frac{x(x^2-1)}{1.2.3}\,\frac{\Delta^3 u_{-1} + \Delta^3 u_{-2}}{2} + \frac{x^2(x^2-1)}{1.2.3.4}\,\Delta^4 u_{-2} + \frac{x\,(x^2-1)\,(x^2-4)}{1.2.3.4.5}\,\frac{\Delta^5 u_{-2} + \Delta^5 u_{-3}}{2} + \frac{x^2\,(x^2-1)\,(x^2-4)}{1.2.3.4.5.6}\,\Delta^6 u_{-3} + \ldots.$$

oder

$$(2)\ldots\ u_x = u + x\,\frac{\Delta u + \Delta u_{-1}}{2} + \frac{x^2}{2}\,\Delta^2 u_{-1} + \frac{x(x^2-1)}{12}\,(\Delta^3 u_{-1} + \Delta^3 u_{-2}) + \frac{x^2(x-1)}{24}\,\Delta^4 u_{-2} + \frac{x\,(x^2-1)\,(x^2-4)}{240}\,(\Delta^5 u_{-2} + \Delta^5 u_{-3}) + \ldots.$$

Tafel I. ist für den Gebrauch der Formel (1), Tafel II. für den der Formel (2) berechnet. Die Formel (1) hat den Vortheil, dass die Correctionen wegen der ungeraden Differenzen beim Gebrauch derselben im Allgemeinen sehr klein sind und beim Interpoliren in die Mitte ganz verschwinden. Wird nämlich $x = \frac{1}{2}$, so werden die ungeraden Glieder, in denen sämmtlich der Factor $x - \frac{1}{2}$ vorkommt, gleich Null, und es entsteht dann die bekannte *Gauss*'sche Formel für die Interpolation in die Mitte

$$u_{\frac{1}{2}} = \tfrac{1}{2}\left\{(u_1 + u) - \tfrac{1}{8}\,(\Delta^2 u + \Delta^2 u_{-1}) + \tfrac{1}{8}\,\tfrac{3}{16}\,(\Delta^4 u_{-1} + \Delta^4 u_{-2}) - \tfrac{1}{8}\,\tfrac{3}{16}\,\tfrac{5}{24}\,(\Delta^6 u_{-2} + \Delta^6 u_{-3}) + \ldots.\right\}$$

S. 106—150. Tafel der trigonometrischen Functionen; dieselbe bedarf keiner Erklärung.

S. 151—169. Quadrate der Zahlen von 1 bis 10000. Die Tafel ist in eine ungewöhnliche Form gebracht, die mir indessen für astronomische Rechnungen nützlich schien. Es kommt bei der Anwendung der Methode der kleinsten Quadrate öfters vor, dass das Quadrat einer vierziffrigen Zahl, z. B. 11.34, gebraucht wird. Die bisher im Gebrauche befindlichen Quadrattafeln geben nun für

solche Fälle entweder das gesuchte Quadrat nicht scharf, sondern nur einige Decimalen, oder ihr Format ist wegen seiner Grösse höchst unbequem. In vorliegender Tafel ist nun durchweg die letzte Ziffer der Quadrate unter die Tafel gesetzt, da sie für die ganze Columne gleich bleibt; und es ist dadurch erreicht, dass alle Quadrate strenge richtig sind. So ist z. B. das Quadrat von 5714 nach S. 101 = 32649796.

S. 170—178 enthalten hypsometrische Tafeln von Dr. *R. Rühlmann*. Dieselben sind dessen Werke: »Die barometrischen Höhenmessungen und ihre Bedeutung für die Physik der Atmosphäre.« Leipzig, Verlag von *Joh. A. Barth* 1870 entnommen, und setze ich die Erläuterung des Herrn Verfassers für die Tafel hierbei:

»Für einen blossen Ueberschlag genügt für Höhen unter 1000 Meter die Annäherungsformel von *Babinet:*

$$h^{met} = 16000 \frac{b' - b''}{b' + b''} \left\{1 + 2 \frac{(t' + t'')}{1000}\right\}$$

Für genaue Rechnung bedient man sich der genauen Formel:

$$h^{met} = 18400 \,.\, 2\left(1.00157 + 0.003675 \frac{t' + t''}{2}\right) \,.$$
$$\left(1 + 0.378 \frac{\frac{\sigma'}{b'} + \frac{\sigma''}{b''}}{2}\right) \,.\, (1 + 0.002623 \cos 2\varphi) \,.$$
$$\left(1 + \frac{2z + h}{6378150}\right) \log \frac{b'}{b''}$$

Hierin bedeutet t' und t'' die Lufttemperatur, b' und b'' den Barometerstand, σ' und σ'' den Dampfdruck an der unteren und oberen Station, φ das arithmetische Mittel der geographischen Breiten beider, und z die Höhe der unteren Station über dem Meere.

Statt aber nach dieser Formel selbst zu rechnen, benutzt man Tabellen und zwar in nachstehender Weise.

Wenn obige Formel logarithmirt wird, so geht sie in die folgende über:

$$\log h = \log\left\{18400 \,.\, 2\left(1.00157 + 0.003675 \frac{t' + t''}{2}\right)\right\} \ldots . A$$
$$+ \log\left\{\log b' - \log b''\right\} \ldots\ldots\ldots B$$
$$+ \log\left\{1 + \frac{0.378}{2} \cdot \left(\frac{\sigma'}{b'} + \frac{\sigma''}{b''}\right)\right\} \ldots\ldots C$$
$$+ \log\left\{1 + 0.002623 \,.\, \cos 2\psi\right\} \ldots\ldots D$$
$$+ \log\left\{1 + \frac{2z + h}{6378150}\right\} \ldots\ldots\ldots E$$

Es ist also

$$\log h = A + B + C + D + E.$$

Die Grössen A, C, D, E sind in Tafeln gebracht worden, und zwar findet sich A in Tabelle I. mit dem Argumente $t' + t''$, D in Tab. II. mit dem Argumente $x = 45^\circ - \psi$, und E mit den Argumenten $\log h$ und z in Tab. III.

Zur Bestimmung von C dienen die 3 Tabellen IV 1, 2, 3. Der Gebrauch derselben ist leicht ersichtlich. Ist am trockenen Thermometer des Psychrometers die Ablesung T' und am feuchten Thermometer T'' gemacht worden, so dient zur Bestimmung des Druckes des in der Luft enthaltenen Wasserdampfes folgende Formel:

$$\sigma = e_1 - 0.0008\,(T' - T'')\,b$$

in welcher e_1 die zu T'' gehörige Maximalspannung bedeutet, und b den stattfindenden Druck. Wenn das Wasser aber am feuchten Thermometer gefroren ist, muss zur Berechnung des Dunstdruckes die folgende Formel benutzt werden:

$$\sigma_1 = e_1 - 0.000691\,(T' - T'')\,b.$$

Statt aber nach diesen Formeln zu rechnen, bedient man sich der Tafeln.

Man sucht zunächst aus IV 1 die zu T'' gehörige Dampfspannung e_1 und zieht hiervon eine Grösse e_2 ab, die aus Tabelle IV 2 erhalten wird, wenn man mit dem Barometerstand b in die horizontalen und mit der Temperaturdifferenz $T' - T''$ in die verticalen Columnen eingeht. Ist das Wasser am feuchten Thermometer gefroren, so bedient man sich der Grössen, welche aus dem zweiten Theile der Tabelle IV 2 entnommen werden. Man findet auf diese Weise für jede Station eine Dampfspannung σ;

$$\sigma = e_1 - e_2;$$

man geht nun mit derselben ein in Tabelle IV 3, benutzt als gleichzeitiges Argument b und erhält die Grössen

$$\log\left(1 + 0.378\,\frac{\sigma'}{b'}\right) \text{ und } \log\left(1 + 0.378\,\frac{\sigma''}{b''}\right).$$

Das arithmetische Mittel führt man ein für das Glied C.

Statt dieses Verfahrens kann aber auch der Werth von C durch nur einmaliges Eingehen in die Tafel IV 3 aus σ', σ'', b' und b'' erhalten werden, wenn man $\frac{\sigma' + \sigma''}{2}$ als das eine, $\frac{b' + b''}{2}$ als das andere Argument wählt. —

Will man die Anwendung von Logarithmen bei Berechnung von Höhen vermeiden, so kann man sich der hypsometrischen Tafeln VI. bis XI. bedienen.

Dieselben sind auf folgende Weise erhalten worden: Zunächst wird die Formel für barometrische Höhenmessungen:

$$h^{met} = 18400.2 \left(1.00157 + 0.03675 \frac{t' + t''}{2}\right) \cdot \left(1 + 0.378 \frac{\frac{\sigma'}{b'} + \frac{\sigma''}{b''}}{2}\right) \cdot \left(1 + 0.002623 \cos 2\psi\right) \cdot \left(1 + \frac{2z + h}{6378150}\right) \log \frac{b'}{b''}$$

in die Form gebracht:

$$h^{met} = 18429 \,.\, 1 \left(1 + 0.00183 \,[t' + t'']\right) \cdot \left(1 + 0.189 \left\{\frac{\sigma'}{b'} + \frac{\sigma''}{b''}\right\}\right) \left(1 \,.\, 0.002623 \cos 2\psi\right) \cdot \left(1 + \frac{2z + h}{6378150}\right) \log \frac{b'}{b''}.$$

Setzt man nun:

$$18429.1 \log \frac{760}{b''} = A_{b''}$$

und

$$18429.1 \log \frac{760}{b'} = A_{b'}$$

so ist

$$A_{b''} - A_{b'} = 18429.1 \log \frac{b'}{b''}$$

Diese Grösse A_b ist in Tafel VI enthalten.

Der so erhaltene Werth ist ein genäherter Werth der Höhe

$$h_1 = A_{b''} - A_{b'}$$

Zu diesem Werthe fügt man nun hinzu die Grösse:

$$h_1 \,.\, 0.00183 \,(t' + t'') = c_1$$

so ist

$$h_2 = h_1 + c_1$$

ein etwas genauerer Näherungswerth der Höhe.

Die Grössen des Correctionsfactors, mit welchem h_1 zu multipliciren ist, um c_1 zu finden, sind in Tab. VII zusammengestellt.

Je nachdem $t' + t'' \gtrless 0$ ist, hat man dem Correctionsfactor einen positiven oder negativen Werth zu geben.

Um den so erhaltenen, genäherten Werth der Höhe wegen des Feuchtigkeitsgehaltes der Luft zu corrigiren, bildet man zunächst die Werthe $0.189 \frac{\sigma'}{b'}$ und $0.189 \frac{\sigma''}{b''}$. Dieselben werden der Tabelle IX entnommen. Mit ihrer Summe wird alsdann die Grösse h_2 multiplicirt, und es ergiebt sich eine neue Verbesserung:

$$c_2 = h_2 \left\{0.189 \frac{\sigma'}{b'} + 0.189 \frac{\sigma''}{b''}\right\}$$

diese zu h^2 hinzu addirt, giebt eine weitere Annäherung:

$$h_3 = h_2 + c_2.$$

Diese Höhe h_3 ist noch zu verbessern mit einem Gliede wegen der Veränderlichkeit der Schwere nach der geographischen Breite, das ist um eine Grösse c_3.

$$c_3 = h_3 . 0.002623 \cos 2\psi.$$

Der Werth des mit h_3 zu multiplicirenden Factors ist nach Vorzeichen und Grösse der Tafel X zu entnehmen.

Es wird nun

$$h_4 = h_3 + c_3$$

gesetzt.

Um den wahren Werth h der Höhe zu erhalten, hat man noch eine vierte Correction c_4 hinzuzufügen, welche unmittelbar aus Tafel XI gefunden wird.

Alsdann ist

$$h = h_4 + c_4.$$

Die Rechnung geht fast ebenso rasch vor sich, als bei Anwendnng von Logarithmen. und es hat diese Methode den Vorzug, dass man den Betrag jeder der Correctionen unmittelbar übersehen kann.«

S. 178. Siedepunct des Wassers bei verschiedenen Barometerständen. Diese kleine Tafel dient bei Untersuchungen von Thermometern zur Bestimmung der Temperatur, bei welcher das Wasser siedet; die Ausdehnung der Tafel reicht für diesen Zweck völlig aus.

S. 179—181. Reduction des altfranzösischen Barometers.

Diese, wie die 3 folgenden Tafeln, dienen zur Reduction der an Barometern mit messingner Scale beobachteten Höhen auf eine Normaltemperatur des Quecksilbers und der Scale. Es ist allgemein gebräuchlich, die Barometerhöhe auf eine Temperatur des Quecksilbers von 0° R zu reduciren; es ist ferner zu bemerken, dass die Normaltemperatur der Scale

1) bei dem altfranzösischen Maasse + 13° R.,
2) bei dem metrischen Maasse 0° R.,
3) bei dem englischen Maasse 62° Fahr.

vorstellt und endlich, dass bei der Berechnung der Tafeln die Ausdehnung von 0° bis 80° Réaumur beim Messing = 0.0018782, beim Quecksilber = 0.018018 angenommen ist. Sei nun h die abgelesene Barometerhöhe, so wird die an dieselbe anzubringende Correction, die direct aus der Tafel mit den Argumenten Barometerhöhe und gemeinschaftliche Temperatur der Scale und des Quecksilbers entnommen wird, für das altfranzösishe Barometer

$$= h . \frac{0.0002252\, t - 0.00002348\,(t - 13)}{1 + 0.0002252\, t}$$

(t = Grade nach *Réaumur.*)

S. 182 u. 183. Reduction der Barometerhöhe in Millimetern. Die Reduction ist

$$= h \cdot \frac{0.000161898\, t}{1 + 0.00018018\, t} \qquad (t = \text{Grade nach } \textit{Celsius}.)$$

S. 184 — 191. Reduction des Englischen Barometers. Die Reduction ist

$$= h \cdot \frac{0.0001001\,(t - 32) - 0.00001043\,(t - 62)}{1 + 0.0001001\,(t - 32)}$$

(t = Grade nach *Fahrenheit*.)

S. 192 — 197. Reduction des altfranzösischen Barometers mit zwei Thermometern.

Die Reduction ist, wenn t die Temperatur des Quecksilbers, und τ die des Messings bezeichnet, beide in Graden nach *Réaumur* ausgedrückt,

$$= h \,.\, 0.0002252\, t + h \,.\, 0.00002348\,(\tau - 13^{\circ}).$$

S. 200 u. 201. Verwandlung der Barometer- und Thermometerscalen. Diese bedarf keiner Erläuterung.

Den Schluss des Buches bildet eine Zusammenstellung einiger häufig gebrauchten Formeln, und sind dieselben eingetheilt worden in

Goniometrische Formeln,
Trigonometrische Formeln,
Astronomische Reductionsformeln.

Bei den letzteren habe ich mich auf diejenigen beschränkt, welche bei Anwendung kleinerer Instrumente, namentlich auf Reisen zu Ortsbestimmungen dienen können. Es kommen hier in Betracht

das Passagen-Instrument im Meridian,
das Passagen-Instrument im Verticale des Polarsterns,
das Passagen-Instrument im ersten Verticale,
Höhen-Instrumente.

Es muss noch erwähnt werden, dass die Formeln zur Reduction der Zeitbestimmung mit dem Passagen-Instrumente im Verticale des Polarsterns von *Döllen* sind.

Bei diesen Formeln ist Rücksicht genommen ausser den Correctionen, die aus den Fehlern des Instrumentes hervorgehen, noch auf die tägliche Aberration. Refraction und Parallaxe sind nicht hinzugezogen, weil hierfür im ersten Theile des Buches Tafeln gegeben sind.

I.

TAFELN.

0h				1h			
St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.
0′37″|0″1							
0′ 37″	0′ 0″1	30′ 31″	0′ 5″0	0′ 26″	0′ 9″9	30′ 20″	0′ 14″8
1 13	0.2	31 8	5.1			30 57	14.9
1 50	0.3	31 44	5.2	1 2	0 10.0		
2 26	0.4	32 21	5.3	1 39	10.1	31 34	0 15.0
3 3	0.5	32 58	5.4	2 16	10.2	32 10	15.1
3 40	0.6	33 34	5.5	2 52	10.3	32 47	15.2
4 16	0.7	34 11	5.6	3 29	10.4	33 24	15.3
4 53	0.8	34 48	5.7	4 6	10.5	34 0	15.4
5 30	0.9	35 24	5.8	4 42	10.6	34 37	15.5
		36 1	5.9	5 19	10.7	35 13	15.6
6 6	0 1.0			5 55	10.8	35 50	15.7
6 43	1.1	36 37	0 6.0	6 32	10.9	36 27	15.8
7 19	1.2	37 14	6.1			37 3	15.9
7 56	1.3	37 51	6.2	7 9	0 11.0		
8 33	1.4	38 27	6.3	7 45	11.1	37 40	0 16.0
9 9	1.5	39 4	6.4	8 22	11.2	38 17	16.1
9 46	1.6	39 41	6.5	8 59	11.3	38 53	16.2
10 23	1.7	40 17	6.6	9 35	11.4	39 30	16.3
10 59	1.8	40 54	6.7	10 12	11.5	40 6	16.4
11 36	1.9	41 30	6.8	10 48	11.6	40 43	16.5
		42 7	6.9	11 25	11.7	41 20	16.6
12 12	0 2.0			12 2	11.8	41 56	16.7
12 49	2.1	42 44	0 7.0	12 38	11.9	42 33	16.8
13 26	2.2	43 20	7.1			43 9	16.9
14 2	2.3	43 57	7.2	13 15	0 12.0		
14 39	2.4	44 34	7.3	13 52	12.1	43 46	0 17.0
15 16	2.5	45 10	7.4	14 28	12.2	44 23	17.1
15 52	2.6	45 47	7.5	15 5	12.3	44 59	17.2
16 29	2.7	46 23	7.6	15 41	12.4	45 36	17.3
17 5	2.8	47 0	7.7	16 18	12.5	46 13	17.4
17 42	2.9	47 37	7.8	16 55	12.6	46 49	17.5
		48 13	7.9	17 31	12.7	47 26	17.6
				18 8	12.8	48 2	17.7
18 19	0 3.0			18 44	12.9	48 39	17.8
18 55	3.1	48 50	0 8.0			49 16	17.9
19 32	3.2	49 27	8.1	19 21	0 13.0		
20 9	3.3	50 3	8.2	19 58	13.1	49 52	0 18.0
20 45	3.4	50 40	8.3	20 34	13.2	50 29	18.1
21 22	3.5	51 16	8.4	21 11	13.3	51 6	18.2
21 58	3.6	51 53	8.5	21 48	13.4	51 42	18.3
22 35	3.7	52 30	8.6	22 24	13.5	52 19	18.4
23 12	3.8	53 6	8.7	23 1	13.6	52 55	18.5
23 48	3.9	53 43	8.8	23 38	13.7	53 32	18.6
		54 20	8.9	24 14	13.8	54 9	18.7
24 25	0 4.0			24 51	13.9	54 45	18.8
25 2	4.1	54 56	0 9.0			55 22	18.9
25 38	4.2	55 33	9.1	25 27	0 14.0		
26 15	4.3	56 9	9.2	26 4	14.1	55 59	0 19.0
26 51	4.4	56 46	9.3	26 41	14.2	56 35	19.1
27 28	4.5	57 23	9.4	27 17	14.3	57 12	19.2
28 5	4.6	57 59	9.5	27 54	14.4	57 48	19.3
28 41	4.7	58 36	9.6	28 31	14.5	58 25	19.4
29 18	4.8	59 13	9.7	29 7	14.6	59 2	19.5
29 55	4.9	59 49	9.8	29 44	14.7	59 38	19.6

2h

St. Zeit	Reduct.	St. Zeit	Reduct.
0m 15s	0m 19s.7	30m 10s	0m 24s.6
0 52	19.8	30 46	24.7
1 28	19.9	31 23	24.8
		31 59	24.9
2 5	0 20.0		
2 41	20.1	32 36	0 25.0
3 18	20.2	33 13	25.1
3 55	20.3	33 49	25.2
4 31	20.4	34 26	25.3
5 8	20.5	35 3	25.4
5 45	20.6	35 39	25.5
6 21	20.7	36 16	25.6
6 58	20.8	36 52	25.7
7 34	20.9	37 29	25.8
		38 6	25.9
8 11	0 21.0		
8 48	21.1	38 42	0 26.0
9 24	21.2	39 19	26.1
10 1	21.3	39 56	26.2
10 38	21.4	40 32	26.3
11 14	21.5	41 9	26.4
11 51	21.6	41 45	26.5
12 27	21.7	42 22	26.6
13 4	21.8	42 59	26.7
13 41	21.9	43 35	26.8
		44 12	26.9
14 17	0 22.0		
14 54	22.1	44 49	0 27.0
15 31	22.2	45 25	27.1
16 7	22.3	46 2	27.2
16 44	22.4	46 38	27.3
17 20	22.5	47 15	27.4
17 57	22.6	47 52	27.5
18 34	22.7	48 28	27.6
19 10	22.8	49 5	27.7
19 47	22.9	49 42	27.8
		50 18	27.9
20 24	0 23.0		
21 0	23.1	50 55	0 28.0
21 37	23.2	51 31	28.1
22 13	23.3	52 8	28.2
22 50	23.4	52 45	28.3
23 27	23.5	53 21	28.4
24 3	23.6	53 58	28.5
24 40	23.7	54 35	28.6
25 17	23.8	55 11	28.7
25 53	23.9	55 48	28.8
		56 24	28.9
26 30	0 24.0		
27 6	24.1	57 1	0 29.0
27 43	24.2	57 38	29.1
28 20	24.3	58 14	29.2
28 56	24.4	58 51	29.3
29 33	24.5	59 28	29.4

3h

St. Zeit	Reduct.	St. Zeit	Reduct.
0m 4s	0m 29s.5	30m 35s	0m 34s.5
0 41	29.6	31 12	34.6
1 17	29.7	31 49	34.7
1 54	29.8	32 25	34.8
2 31	29.9	33 2	34.9
3 7	0 30.0	33 38	0 35.0
3 44	30.1	34 15	35.1
4 21	30.2	34 52	35.2
4 57	30.3	35 28	35.3
5 34	30.4	36 5	35.4
6 10	30.5	36 42	35.5
6 47	30.6	37 18	35.6
7 24	30.7	37 55	35.7
8 0	30.8	38 31	35.8
8 37	30.9	39 8	35.9
9 14	0 31.0	39 45	0 36.0
9 50	31.1	40 21	36.1
10 27	31.2	40 58	36.2
11 3	31.3	41 35	36.3
11 40	31.4	42 11	36.4
12 17	31.5	42 48	36.5
12 53	31.6	43 24	36.6
13 30	31.7	44 1	36.7
14 7	31.8	44 38	36.8
14 43	31.9	45 14	36.9
15 20	0 32.0	45 51	0 37.0
15 56	32.1	46 28	37.1
16 33	32.2	47 4	37.2
17 10	32.3	47 41	37.3
17 46	32.4	48 17	37.4
18 23	32.5	48 54	37.5
19 0	32.6	49 31	37.6
19 36	32.7	50 7	37.7
20 13	32.8	50 44	37.8
20 49	32.9	51 21	37.9
21 26	0 33.0	51 57	0 38.0
22 3	33.1	52 34	38.1
22 39	33.2	53 10	38.2
23 16	33.3	53 47	38.3
23 52	33.4	54 24	38.4
24 29	33.5	55 0	38.5
25 6	33.6	55 37	38.6
25 42	33.7	56 14	38.7
26 19	33.8	56 50	38.8
26 56	33.9	57 27	38.9
27 32	0 34.0	58 3	0 39.0
28 9	34.1	58 40	39.1
28 45	34.2	59 17	39.2
29 22	34.3	59 53	39.3
29 59	34.4		

4s	0s.01
7	0.02
11	0.03
15	0.04
18	0.05
22	0.06
26	0.07
29	0.08
33	0.09

0′ 37″	0″.1
1 13	0.2

4h				5h			
St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.
0′ 30″	0′ 39″.4	30′ 25	0′ 44″.3	0′ 19″	0′ 49″.2	30′ 14″	0′ 54″.1
1 7	39.5	31 1	44.4	0 56	49.3	30 50	54.2
1 43	39.6	31 38	44.5	1 32	49.4	31 27	54.3
2 20	39.7	32 14	44.6	2 9	49.5	32 4	54.4
2 56	39.8	32 51	44.7	2 46	49.6	32 40	54.5
3 33	39.9	33 28	44.8	3 22	49.7	33 17	54.6
		34 4	44.9	3 59	49.8	33 53	54.7
4 10	0′ 40.0			4 35	49.9	34 30	54.8
4 46	40.1	34 41	0 45.0			35 7	54.9
5 23	40.2	35 18	45.1	5 12	0 50.0		
6 0	40.3	35 54	45.2	5 49	50.1	35 43	0′ 55.0
6 36	40.4	36 31	45.3	6 25	50.2	36 20	55.1
7 13	40.5	37 7	45.4	7 2	50.3	36 57	55.2
7 49	40.6	37 44	45.5	7 39	50.4	37 33	55.3
8 26	40.7	38 21	45.6	8 15	50.5	38 10	55.4
9 3	40.8	38 57	45.7	8 52	50.6	38 46	55.5
9 39	40.9	39 34	45.8	9 28	50.7	39 23	55.6
		40 10	45.9	10 5	50.8	40 0	55.7
10 16	0 41.0			10 42	50.9	40 36	55.8
10 53	41.1	40 47	0 46.0			41 13	55.9
11 29	41.2	41 24	46.1	11 18	0 51.0		
12 6	41.3	42 0	46.2	11 55	51.1	41 50	0′ 56.0
12 42	41.4	42 37	46.3	12 32	51.2	42 26	56.1
13 19	41.5	43 14	46.4	13 8	51.3	43 3	56.2
13 56	41.6	43 50	46.5	13 45	51.4	43 40	56.3
14 32	41.7	44 27	46.6	14 21	51.5	44 16	56.4
15 9	41.8	45 4	46.7	14 58	51.6	44 53	56.5
15 46	41.9	45 40	46.8	15 35	51.7	45 29	56.6
		46 17	46.9	16 11	51.8	46 6	56.7
16 22	0 42.0			16 48	51.9	46 43	56.8
16 59	42.1	46 53	0 47.0			47 19	56.9
17 35	42.2	47 30	47.1	17 25	0 52.0		
18 12	42.3	48 7	47.2	18 1	52.1	47 56	0 57.0
18 49	42.4	48 43	47.3	18 38	52.2	48 32	57.1
19 25	42.5	49 20	47.4	19 14	52.3	49 9	57.2
20 2	42.6	49 57	47.5	19 51	52.4	49 46	57.3
20 39	42.7	50 33	47.6	20 28	52.5	50 22	57.4
21 15	42.8	51 10	47.7	21 4	52.6	50 59	57.5
21 52	42.9	51 46	47.8	21 41	52.7	51 36	57.6
		52 23	47.9	22 18	52.8	52 12	57.7
22 28	0 43.0			22 54	52.9	52 49	57.8
23 5	43.1	53 0	0 48.0			53 25	57.9
23 42	43.2	53 36	48.1	23 31	0 53.0		
24 18	43.3	54 13	48.2	24 7	53.1	54 2	0 58.0
24 55	43.4	54 50	48.3	24 44	53.2	54 39	58.1
25 32	43.5	55 26	48.4	25 21	53.3	55 15	58.2
26 8	43.6	56 3	48.5	25 57	53.4	55 52	58.3
26 45	43.7	56 39	48.6	26 34	53.5	56 29	58.4
27 21	43.8	57 16	48.7	27 11	53.6	57 5	58.5
27 58	43.9	57 53	48.8	27 47	53.7	57 42	58.6
		58 29	48.9	28 24	53.8	58 18	58.7
28 35	0 44.0			29 0	53.9	58 55	58.8
29 11	44.1	59 6	0 49.0			59 32	58.9
29 48	44.2	59 43	49.1	29 37	0 54.0		

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6^h

St. Zeit	Reduct.	St. Zeit	Reduct.
0′ 8″	0′ 59″0	30′ 40″	1′ 4″0
0 45	59.1	31 16	4.1
1 22	59.2	31 53	4.2
1 58	59.3	32 29	4.3
2 35	59.4	33 6	4.4
3 11	59.5	33 43	4.5
3 48	59.6	34 19	4.6
4 25	59.7	34 56	4.7
5 1	59.8	35 33	4.8
5 38	59.9	36 9	4.9
6 15	1 0.0	36 46	1 5.0
6 51	0.1	37 22	5.1
7 28	0.2	37 59	5.2
8 4	0.3	38 36	5.3
8 41	0.4	39 12	5.4
9 18	0.5	39 49	5.5
9 54	0.6	40 26	5.6
10 31	0.7	41 2	5.7
11 8	0.8	41 39	5.8
11 44	0.9	42 15	5.9
12 21	1 1.0	42 52	1 6.0
12 57	1.1	43 29	6.1
13 34	1.2	44 5	6.2
14 11	1.3	44 42	6.3
14 47	1.4	45 18	6.4
15 24	1.5	45 55	6.5
16 1	1.6	46 32	6.6
16 37	1.7	47 8	6.7
17 14	1.8	47 45	6.8
17 50	.9	48 22	6.9
18 27	1 2.0	48 58	1 7.0
19 4	2.1	49 35	7.1
19 40	2.2	50 11	7.2
20 17	2.3	50 48	7.3
20 54	2.4	51 25	7.4
21 30	2.5	52 1	7.5
22 7	2.6	52 38	7.6
22 43	2.7	53 15	7.7
23 20	2.8	53 51	7.8
23 57	2.9	54 28	7.9
24 33	1 3.0	55 4	1 8.0
25 10	3.1	55 41	8.1
25 47	3.2	56 18	8.2
26 23	3.3	56 54	8.3
27 0	3.4	57 31	8.4
27 36	3.5	58 8	8.5
28 13	3.6	58 44	8.6
28 50	3.7	59 21	8.7
29 26	3.8	59 57	8.8
30 3	3.9		

7^h

St. Zeit	Reduct.	St. Zeit	Reduct.
0′ 34″	1′ 8″9	30′ 29″	1′ 13″8
		31 5	13.9
1 11	1 9.0		
1 47	9.1	31 42	1 14.0
2 24	9.2	32 19	14.1
3 1	9.3	32 55	14.2
3 37	9.4	33 32	14.3
4 14	9.5	34 8	14.4
4 50	9.6	34 45	14.5
5 27	9.7	35 22	14.6
6 4	9.8	35 58	14.7
6 40	9.9	36 35	14.8
		37 12	14.9
7 17	1 10.0		
7 54	10.1	37 48	1 15.0
8 30	10.2	38 25	15.1
9 7	10.3	39 1	15.2
9 43	10.4	39 38	15.3
10 20	10.5	40 15	15.4
10 57	10.6	40 51	15.5
11 33	10.7	41 28	15.6
12 10	10.8	42 5	15.7
12 47	10.9	42 41	15.8
		43 18	15.9
13 23	1 11.0		
14 0	11.1	43 54	1 16.0
14 36	11.2	44 31	16.1
15 13	11.3	45 8	16.2
15 50	11.4	45 44	16.3
16 26	11.5	46 21	16.4
17 3	11.6	46 58	16.5
17 40	11.7	47 34	16.6
18 16	11.8	48 11	16.7
18 53	11.9	48 47	16.8
		49 24	16.9
19 29	1 12.0		
20 6	12.1	50 1	1 17.0
20 43	12.2	50 37	17.1
21 19	12.3	51 14	17.2
21 56	12.4	51 51	17.3
22 33	12.5	52 27	17.4
23 9	12.6	53 4	17.5
23 46	12.7	53 40	17.6
24 22	12.8	54 17	17.7
24 59	12.9	54 54	17.8
		55 30	17.9
25 36	1 13.0		
26 12	13.1	56 7	1 18.0
26 49	13.2	56 44	18.1
27 26	13.3	57 20	18.2
28 2	13.4	57 57	18.3
28 39	13.5	58 33	18.4
29 15	13.6	59 10	18.5
29 52	13.7	59 47	18.6

4″	0″01
7	0.02
11	0.03
15	0.04
18	0.05
22	0.06
26	0.07
29	0.08
33	0.09

1'13''	0''2
1 50	0.3

8h				9h			
St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.
0' 23''	1' 18''7	30' 18''	1' 23''6	0' 12''	1' 28''5	30' 7''	1' 33''4
1 0	18.8	30 54	23.7	0 49	28.6	30 44	33.5
1 36	18.9	31 31	23.8	1 26	28.7	31 20	33.6
		32 8	23.9	2 2	28.8	31 57	33.7
2 13	1 19.0			2 39	28.9	32 34	33.8
2 50	19.1	32 44	1 24.0			33 10	33.9
3 26	19.2	33 21	24.1	3 16	1 29.0		
4 3	19.3	33 58	24.2	3 52	29.1	33 47	1 34.0
4 40	19.4	34 34	24.3	4 29	29.2	34 23	34.1
5 16	19.5	35 11	24.4	5 6	29.3	35 0	34.2
5 53	19.6	35 47	24.5	5 42	29.4	35 37	34.3
6 30	19.7	36 24	24.6	6 19	29.5	36 13	34.4
7 6	19.8	37 1	24.7	6 55	29.6	36 50	34.5
7 43	19.9	37 37	24.8	7 32	29.7	37 27	34.6
		38 14	24.9	8 9	29.8	38 3	34.7
8 19	1 20.0			8 45	29.9	38 40	34.8
8 56	20.1	38 51	1 25.0			39 16	34.9
9 33	20.2	39 27	25.1	9 22	1 30.0		
10 9	20.3	40 4	25.2	9 58	30.1	39 53	1 35.0
10 46	20.4	40 40	25.3	10 35	30.2	40 30	35.1
11 23	20.5	41 17	25.4	11 12	30.3	41 6	35.2
11 59	20.6	41 54	25.5	11 48	30.4	41 43	35.3
12 36	20.7	42 30	25.6	12 25	30.5	42 20	35.4
13 12	20.8	43 7	25.7	13 2	30.6	42 56	35.5
13 49	20.9	43 44	25.8	13 38	30.7	43 33	35.6
		44 20	25.9	14 15	30.8	44 9	35.7
14 26	1 21.0			14 51	30.9	44 46	35.8
15 2	21.1	44 57	1 26.0			45 23	35.9
15 39	21.2	45 33	26.1	15 28	1 31.0		
16 16	21.3	46 10	26.2	16 5	31.1	45 59	1 36.0
16 52	21.4	46 47	26.3	16 41	31.2	46 36	36.1
17 29	21.5	47 23	26.4	17 18	31.3	47 13	36.2
18 5	21.6	48 0	26.5	17 55	31.4	47 49	36.3
18 42	21.7	48 37	26.6	18 31	31.5	48 26	36.4
19 19	21.8	49 13	26.7	19 8	31.6	49 2	36.5
19 55	21.9	49 50	26.8	19 44	31.7	49 39	36.6
		50 26	26.9	20 21	31.8	50 16	36.7
20 32	1 22.0			20 58	31.9	50 52	36.8
21 9	22.1	51 3	1 27.0			51 29	36.9
21 45	22.2	51 40	27.1	21 34	1 32.0		
22 22	22.3	52 16	27.2	22 11	32.1	52 6	1 37.0
22 58	22.4	52 53	27.3	22 48	32.2	52 42	37.1
23 35	22.5	53 30	27.4	23 24	32.3	53 19	37.2
24 12	22.6	54 6	27.5	24 1	32.4	53 55	37.3
24 48	22.7	54 43	27.6	24 37	32.5	54 32	37.4
25 25	22.8	55 19	27.7	25 14	32.6	55 9	37.5
26 1	22.9	55 56	27.8	25 51	32.7	55 45	37.6
		56 33	27.9	26 27	32.8	56 22	37.7
26 38	1 23.0			27 4	32.9	56 59	37.8
27 15	23.1	57 9	1 28.0			57 35	37.9
27 51	23.2	57 46	28.1	27 41	1 33.0		
28 28	23.3	58 23	28.2	28 17	33.1	58 12	1 38.0
29 5	23.4	58 59	28.3	28 54	33.2	58 48	38.1
29 41	23.5	59 36	28.4	29 30	33.3	59 25	38.2

10^h				11^h			
St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.
0′ 2″	1″38″3	30′ 33″	1′43″3	0′ 27″	1′48″2	30′ 22″	1′53″1
0 38	38.4	31 9	43.4	1 4	48.3	30 59	53.2
1 15	38.5	31 46	43.5	1 41	48.4	31 35	53.3
1 52	38.6	32 23	43.6	2 17	48.5	32 12	53.4
2 28	38.7	32 59	43.7	2 54	48.6	32 49	53.5
3 5	38.8	33 36	43.8	3 31	48.7	33 25	53.6
3 41	38.9	34 13	43.9	4 7	48.8	34 2	53.7
				4 44	48.9	34 38	53.8
4 18	1 39.0	34 49	1 44.0			35 15	53.9
4 55	39.1	35 26	44.1	5 20	1 49.0		
5 31	39.2	36 2	44.2	5 57	49.1	35 52	1 54.0
6 8	39.3	36 39	44.3	6 34	49.2	36 28	54.1
6 44	39.4	37 16	44.4	7 10	49.3	37 5	54.2
7 21	39.5	37 52	44.5	7 47	49.4	37 42	54.3
7 58	39.6	38 29	44.6	8 24	49.5	38 18	54.4
8 34	39.7	39 6	44.7	9 0	49.6	38 55	54.5
9 11	39.8	39 42	44.8	9 37	49.7	39 31	54.6
9 48	39.9	40 19	44.9	10 13	49.8	40 8	54.7
				10 50	49.9	40 45	54.8
10 24	1 40.0	40 55	1 45.0			41 21	54.9
11 1	40.1	41 32	45.1	11 27	1 50.0		
11 37	40.2	42 9	45.2	12 3	50.1	41 58	1 55.0
12 14	40.3	42 45	45.3	12 40	50.2	42 35	55.1
12 51	40.4	43 22	45.4	13 17	50.3	43 11	55.2
13 27	40.5	43 59	45.5	13 53	50.4	43 48	55.3
14 4	40.6	44 35	45.6	14 30	50.5	44 24	55.4
14 41	40.7	45 12	45.7	15 6	50.6	45 1	55.5
15 17	40.8	45 48	45.8	15 43	50.7	45 38	55.6
15 54	40.9	46 25	45.9	16 20	50.8	46 14	55.7
				16 56	50.9	46 51	55.8
16 30	1 41.0	47 2	1 46.0			47 27	55.9
17 7	41.1	47 38	46.1	17 33	1 51.0		
17 44	41.2	48 15	46.2	18 10	51.1	48 4	1 56.0
18 20	41.3	48 52	46.3	18 46	51.2	48 41	56.1
18 57	41.4	49 28	46.4	19 23	51.3	49 17	56.2
19 34	41.5	50 5	46.5	19 59	51.4	49 54	56.3
20 10	41.6	50 41	46.6	20 36	51.5	50 31	56.4
20 47	41.7	51 18	46.7	21 13	51.6	51 7	56.5
21 23	41.8	51 55	46.8	21 49	51.7	51 44	56.6
22 0	41.9	52 31	46.9	22 26	51.8	52 20	56.7
				23 2	51.9	52 57	56.8
22 37	1 42.0	53 8	1 47.0			53 34	56.9
23 13	42.1	53 45	47.1	23 39	1 52.0		
23 50	42.2	54 21	47.2	24 16	52.1		
24 27	42.3	54 58	47.3	24 52	52.2	54 10	1 57.0
25 3	42.4	55 34	47.4	25 29	52.3	54 47	57.1
25 40	42.5	56 11	47.5	26 6	52.4	55 24	57.2
26 16	42.6	56 48	47.6	26 42	52.5	56 0	57.3
26 53	42.7	57 24	47.7	27 19	52.6	56 37	57.4
27 30	42.8	58 1	47.8	27 56	52.7	57 13	57.5
28 6	42.9	58 38	47.9	28 32	52.8	57 50	57.6
				29 9	52.9	58 27	57.7
28 43	1 43.0	59 14	1 48.0			59 3	57.8
29 20	43.1	59 51	48.1	29 45	1 53.0	59 40	57.9
29 56	43.2						

4″	0″01
7	0.02
11	0.03
15	0.04
18	0.05
22	0.06
26	0.07
29	0.08
33	0.09

1′ 50″	0″3
2 26	0.4

12h				13h			
St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.
0′ 17″	1′ 58″0	30′ 11″	2′ 2″9	0′ 6″	2′ 7″8	30′ 37″	2′ 12″8
0 53	58.1			0 42	7.9	31 14	12.9
1 30	58.2	30 48	2 3.0				
2 6	58.3	31 24	3.1	1 19	2 8.0	31 50	2 13.0
2 43	58.4	32 1	3.2	1 56	8.1	32 27	13.1
3 20	58.5	32 38	3.3	2 32	8.2	33 3	13.2
3 56	58.6	33 14	3.4	3 9	8.3	33 40	13.3
4 33	58.7	33 51	3.5	3 46	8.4	34 17	13.4
5 10	58.8	34 28	3.6	4 22	8.5	34 53	13.5
5 46	58.9	35 4	3.7	4 59	8.6	35 30	13.6
		35 41	3.8	5 35	8.7	36 7	13.7
6 23	1 59.0	36 17	3.9	6 12	8.8	36 43	13.8
6 59	59.1			6 49	8.9	37 20	13.9
7 36	59.2	36 54	2 4.0				
8 13	59.3	37 31	4.1	7 25	2 9.0	37 56	2 14.0
8 49	59.4	38 7	4.2	8 2	9.1	38 33	14.1
9 26	59.5	38 44	4.3	8 39	9.2	39 10	14.2
10 3	59.6	39 21	4.4	9 15	9.3	39 46	14.3
10 39	59.7	39 57	4.5	9 52	9.4	40 23	14.4
11 16	59.8	40 34	4.6	10 28	9.5	41 0	14.5
11 52	59.9	41 10	4.7	11 5	9.6	41 36	14.6
		41 47	4.8	11 42	9.7	42 13	14.7
12 29	2 0.0	42 24	4.9	12 18	9.8	42 49	14.8
13 6	0.1			12 55	9.9	43 26	14.9
13 42	0.2	43 0	2 5.0				
14 19	0.3	43 37	5.1	13 32	2 10.0	44 3	2 15.0
14 56	0.4	44 14	5.2	14 8	10.1	44 39	15.1
15 32	0.5	44 50	5.3	14 45	10.2	45 16	15.2
16 9	0.6	45 27	5.4	15 21	10.3	45 53	15.3
16 45	0.7	46 3	5.5	15 58	10.4	46 29	15.4
17 22	0.8	46 40	5.6	16 35	10.5	47 6	15.5
17 59	0.9	47 17	5.7	17 11	10.6	47 42	15.6
		47 53	5.8	17 48	10.7	48 19	15.7
18 35	2 1.0	48 30	5.9	18 25	10.8	48 56	15.8
19 12	1.1			19 1	10.9	49 32	15.9
19 49	1.2	49 7	2 6.0				
20 25	1.3	49 43	6.1	19 38	2 11.0	50 9	2 16.0
21 2	1.4	50 20	6.2	20 14	11.1	50 46	16.1
21 38	1.5	50 56	6.3	20 51	11.2	51 22	16.2
22 15	1.6	51 33	6.4	21 28	11.3	51 59	16.3
22 52	1.7	52 10	6.5	22 4	11.4	52 35	16.4
23 28	1.8	52 46	6.6	22 41	11.5	53 12	16.5
24 5	1.9	53 23	6.7	23 18	11.6	53 49	16.6
		54 0	6.8	23 54	11.7	54 25	16.7
24 42	2 2.0	54 36	6.9	24 31	11.8	55 2	16.8
25 18	2.1			25 7	11.9	55 39	16.9
25 55	2.2	55 13	2 7.0				
26 32	2.3	55 49	7.1	25 44	2 12.0	56 15	2 17.0
27 8	2.4	56 26	7.2	26 21	12.1	56 52	17.1
27 45	2.5	57 3	7.3	26 57	12.2	57 28	17.2
28 21	2.6	57 39	7.4	27 34	12.3	58 5	17.3
28 58	2.7	58 16	7.5	28 10	12.4	58 42	17.4
29 35	2.8	58 53	7.6	28 47	12.5	59 18	17.5
		59 29	7.7	29 24	12.6	59 55	17.6
				30 0	12.7		

14h				15h			
St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.
0′ 32″	2′ 17″7	30′ 26″	2′ 22″6	0′ 21″	2′ 27″5	30′ 15″	2′ 32″4
1 8	17.8	31 3	22.7	0 57	27.6	30 52	32.5
1 45	17.9	31 39	22.8	1 34	27.7	31 29	32.6
		32 16	22.9	2 11	27.8	32 5	32.7
2 21	2 18.0			2 47	27.9	32 42	32.8
2 58	18.1	32 53	2 23.0			33 18	32.9
3 35	18.2	33 29	23.1	3 24	2 28.0		
4 11	18.3	34 6	23.2	4 1	28.1	33 55	2 33.0
4 48	18.4	34 43	23.3	4 37	28.2	34 32	33.1
5 25	18.5	35 19	23.4	5 14	28.3	35 8	33.2
6 1	18.6	35 56	23.5	5 50	28.4	35 45	33.3
6 38	18.7	36 32	23.6	6 27	28.5	36 22	33.4
7 14	18.8	37 9	23.7	7 4	28.6	36 58	33.5
7 51	18.9	37 46	23.8	7 40	28.7	37 35	33.6
		38 22	23.9	8 17	28.8	38 11	33.7
8 28	2 19.0			8 53	28.9	38 48	33.8
9 4	19.1	38 59	2 24.0			39 25	33.9
9 41	19.2	39 36	24.1	9 30	2 29.0		
10 18	19.3	40 12	24.2	10 7	29.1	40 1	2 34.0
10 54	19.4	40 49	24.3	10 43	29.2	40 38	34.1
11 31	19.5	41 25	24.4	11 20	29.3	41 15	34.2
12 7	19.6	42 2	24.5	11 57	29.4	41 51	34.3
12 44	19.7	42 39	24.6	12 33	29.5	42 28	34.4
13 21	19.8	43 15	24.7	13 10	29.6	43 4	34.5
13 57	19.9	43 52	24.8	13 46	29.7	43 41	34.6
		44 28	24.9	14 23	29.8	44 18	34.7
14 34	2 20.0			15 0	29.9	44 54	34.8
15 11	20.1	45 5	2 25.0			45 31	34.9
15 47	20.2	45 42	25.1	15 36	2 30.0		
16 24	20.3	46 18	25.2	16 13	30.1	46 8	2 35.0
17 0	20.4	46 55	25.3	16 50	30.2	46 44	35.1
17 37	20.5	47 32	25.4	17 26	30.3	47 21	35.2
18 14	20.6	48 8	25.5	18 3	30.4	47 58	35.3
18 50	20.7	48 45	25.6	18 39	30.5	48 34	35.4
19 27	20.8	49 22	25.7	19 16	30.6	49 11	35.5
20 4	20.9	49 58	25.8	19 53	30.7	49 47	35.6
		50 35	25.9	20 29	30.8	50 24	35.7
20 40	2 21.0			21 6	30.9	51 1	35.8
21 17	21.1	51 11	2 26.0			51 37	35.9
21 53	21.2	51 48	26.1	21 43	2 31.0		
22 30	21.3	52 25	26.2	22 19	31.1	52 14	2 36.0
23 7	21.4	53 1	26.3	22 56	31.2	52 50	36.1
23 43	21.5	53 38	26.4	23 32	31.3	53 27	36.2
24 20	21.6	54 15	26.5	24 9	31.4	54 4	36.3
24 57	21.7	54 51	26.6	24 46	31.5	54 40	36.4
25 33	21.8	55 28	26.7	25 22	31.6	55 17	36.5
26 10	21.9	56 4	26.8	25 59	31.7	55 54	36.6
		56 41	26.9	26 36	31.8	56 30	36.7
26 46	2 22.0			27 12	31.9	57 7	36.8
27 23	22.1	57 18	2 27.0			57 44	36.9
28 0	22.2	57 54	27.1	27 49	2 32.0		
28 36	22.3	58 31	27.2	28 25	32.1	58 20	2 37.0
29 13	22.4	59 8	27.3	29 2	32.2	58 57	37.1
29 50	22.5	59 44	27.4	29 39	32.3	59 33	37.2

4″	0″01
7	0.02
11	0.03
15	0.04
18	0.05
22	0.06
26	0.07
29	0.08
33	0.09

2ʰ 26ᵐ	0ˢ.4
3 3	0.5

16ʰ				17ʰ			
St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.
0ʰ 10ᵐ	2ʳ 37ˢ.3	30ʰ 41ᵐ	2ʳ 42ˢ.3	0ʰ 36ᵐ	2ʳ 47ˢ.2	30ʰ 30ᵐ	2ʳ 52ˢ.1
0 47	37.4	31 18	42.4	1 12	47.3	31 7	52.2
1 23	37.5	31 54	42.5	1 49	47.4	31 44	52.3
2 0	37.6	32 31	42.6	2 26	47.5	32 20	52.4
2 36	37.7	33 8	42.7	3 2	47.6	32 57	52.5
3 13	37.8	33 44	42.8	3 39	47.7	33 33	52.6
3 50	37.9	34 21	42.9	4 15	47.8	34 10	52.7
				4 52	47.9	34 47	52.8
4 26	2 38.0	34 58	2 43.0			35 23	52.9
5 3	38.1	35 34	43.1	5 29	2 48.0		
5 40	38.2	36 11	43.2	6 5	48.1	36 0	2 53.0
6 16	38.3	36 47	43.3	6 42	48.2	36 37	53.1
6 53	38.4	37 24	43.4	7 19	48.3	37 13	53.2
7 29	38.5	38 1	43.5	7 55	48.4	37 50	53.3
8 6	38.6	38 37	43.6	8 32	48.5	38 26	53.4
8 43	38.7	39 14	43.7	9 8	48.6	39 3	53.5
9 19	38.8	39 51	43.8	9 45	48.7	39 40	53.6
9 56	38.9	40 27	43.9	10 22	48.8	40 16	53.7
				10 58	48.9	40 53	53.8
10 33	2 39.0	41 4	2 44.0			41 30	53.9
11 9	39.1	41 40	44.1	11 35	2 49.0		
11 46	39.2	42 17	44.2	12 12	49.1	42 6	2 54.0
12 22	39.3	42 54	44.3	12 48	49.2	42 43	54.1
12 59	39.4	43 30	44.4	13 25	49.3	43 19	54.2
13 36	39.5	44 7	44.5	14 1	49.4	43 56	54.3
14 12	39.6	44 44	44.6	14 38	49.5	44 33	54.4
14 49	39.7	45 20	44.7	15 15	49.6	45 9	54.5
15 26	39.8	45 57	44.8	15 51	49.7	45 46	54.6
16 2	39.9	46 33	44.9	16 28	49.8	46 23	54.7
				17 5	49.9	46 59	54.8
16 39	2 40.0	47 10	2 45.0			47 36	54.9
17 15	40.1	47 47	45.1	17 41	2 50.0		
17 52	40.2	48 23	45.2	18 18	50.1		
18 29	40.3	49 0	45.3	18 54	50.2	48 12	2 55.0
19 5	40.4	49 36	45.4	19 31	50.3	48 49	55.1
19 42	40.5	50 13	45.5	20 8	50.4	49 26	55.2
20 19	40.6	50 50	45.6	20 44	50.5	50 2	55.3
20 55	40.7	51 26	45.7	21 21	50.6	50 39	55.4
21 32	40.8	52 3	45.8	21 58	50.7	51 16	55.5
22 8	40.9	52 40	45.9	22 34	50.8	51 52	55.6
				23 11	50.9	52 29	55.7
22 45	2 41.0	53 16	2 46.0			53 5	55.8
23 22	41.1	53 53	46.1	23 47	2 51.0	53 42	55.9
23 58	41.2	54 29	46.2	24 24	51.1		
24 35	41.3	55 6	46.3	25 1	51.2	54 19	2 56.0
25 12	41.4	55 43	46.4	25 37	51.3	54 55	56.1
25 48	41.5	56 19	46.5	26 14	51.4	55 32	56.2
26 25	41.6	56 56	46.6	26 51	51.5	56 9	56.3
27 1	41.7	57 33	46.7	27 27	51.6	56 45	56.4
27 38	41.8	58 9	46.8	28 4	51.7	57 22	56.5
28 15	41.9	58 46	46.9	28 40	51.8	57 58	56.6
				29 17	51.9	58 35	56.7
28 51	2 42.0	59 22	2 47.0			59 12	56.8
29 28	42.1	59 59	47.1	29 54	2 52.0	59 48	56.9
30 5	42.2						

18h				19h			
St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.
0h 25m	2m 57s.0	30m 19m	3m 1s.9	0h 14m	3m 6s.8	30m 9m	3m 11s.7
1 2	57.1			0 51	6.9	30 45	11.8
1 38	57.2	30 56	3 2.0			31 22	11.9
2 15	57.3	31 33	2.1	1 27	3 7.0		
2 51	57.4	32 9	2.2	2 4	7.1	31 59	3 12.0
3 28	57.5	32 46	2.3	2 41	7.2	32 35	12.1
4 5	57.6	33 23	2.4	3 17	7.3	33 12	12.2
4 41	57.7	33 59	2.5	3 54	7.4	33 48	12.3
5 18	57.8	34 36	2.6	4 30	7.5	34 25	12.4
5 54	57.9	35 12	2.7	5 7	7.6	35 2	12.5
		35 49	2.8	5 44	7.7	35 38	12.6
6 31	2 58.0	36 26	2.9	6 20	7.8	36 15	12.7
7 8	58.1			6 57	7.9	36 52	12.8
7 44	58.2	37 2	3 3.0			37 28	12.9
8 21	58.3	37 39	3.1	7 34	3 8.0		
8 58	58.4	38 16	3.2	8 10	8.1	38 5	3 13.0
9 34	58.5	38 52	3.3	8 47	8.2	38 41	13.1
10 11	58.6	39 29	3.4	9 24	8.3	39 18	13.2
10 48	58.7	40 5	3.5	10 0	8.4	39 55	13.3
11 24	58.8	40 42	3.6	10 37	8.5	40 31	13.4
12 1	58.9	41 19	3.7	11 13	8.6	41 8	13.5
		41 55	3.8	11 50	8.7	41 45	13.6
12 37	2 59.0	42 32	3.9	12 27	8.8	42 21	13.7
13 14	59.1			13 3	8.9	42 58	13.8
13 51	59.2	43 9	3 4.0			43 34	13.9
14 27	59.3	43 45	4.1	13 40	3 9.0		
15 4	59.4	44 22	4.2	14 16	9.1	44 11	3 14.0
15 41	59.5	44 58	4.3	14 53	9.2	44 48	14.1
16 17	59.6	45 35	4.4	15 30	9.3	45 24	14.2
16 54	59.7	46 12	4.5	16 6	9.4	46 1	14.3
17 30	59.8	46 48	4.6	16 43	9.5	46 38	14.4
18 7	59.9	47 25	4.7	17 20	9.6	47 14	14.5
		48 2	4.8	17 56	9.7	47 51	14.6
18 44	3 0.0	48 38	4.9	18 33	9.8	48 27	14.7
19 20	0.1			19 10	9.9	49 4	14.8
19 57	0.2	49 15	3 5.0			49 41	14.9
20 34	0.3	49 52	5.1	19 46	3 10.0		
21 10	0.4	50 28	5.2	20 23	10.1	50 17	3 15.0
21 47	0.5	51 5	5.3	20 59	10.2	50 54	15.1
22 23	0.6	51 41	5.4	21 36	10.3	51 31	15.2
23 0	0.7	52 18	5.5	22 13	10.4	52 7	15.3
23 37	0.8	52 55	5.6	22 49	10.5	52 44	15.4
24 13	0.9	53 31	5.7	23 26	10.6	53 20	15.5
		54 8	5.8	24 2	10.7	53 57	15.6
24 50	3 1.0	54 44	5.9	24 39	10.8	54 34	15.7
25 27	1.1			25 16	10.9	55 10	15.8
26 3	1.2	55 21	3 6.0			55 47	15.9
26 40	1.3	55 58	6.1	25 52	3 11.0		
27 16	1.4	56 34	6.2	26 29	11.1	56 24	3 16.0
27 53	1.5	57 11	6.3	27 6	11.2	57 0	16.1
28 30	1.6	57 48	6.4	27 42	11.3	57 37	16.2
29 6	1.7	58 24	6.5	28 19	11.4	58 13	16.3
29 43	1.8	59 1	6.6	28 55	11.5	58 50	16.4
		59 37	6.7	29 32	11.6	59 27	16.5

4m	0s.03
7	0.04
11	0.05
15	0.06
18	0.07
22	0.08
26	0.09
29	0.10
33	0.11

3′ 3″	0″5
3 40	0.6

20h				21h			
St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.
0′ 3″	3′ 16″6	30′ 34″	3′ 21″6	0′ 29″	3′ 26″5	30′ 24″	3′ 31″4
0 40	16.7	31 11	21.7	1 6	26.6	31 0	31.5
1 17	16.8	31 48	21.8	1 42	26.7	31 37	31.6
1 53	16.9	32 24	21.9	2 19	26.8	32 14	31.7
				2 56	26.9	32 50	31.8
2 30	3 17.0	33 1	3 22.0			33 27	31.9
3 6	17.1	33 38	22.1	3 32	3 27.0		
3 43	17.2	34 14	22.2	4 9	27.1	34 3	3 32.0
4 20	17.3	34 51	22.3	4 45	27.2	34 40	32.1
4 56	17.4	35 27	22.4	5 22	27.3	35 17	32.2
5 33	17.5	36 4	22.5	5 59	27.4	35 53	32.3
6 10	17.6	36 41	22.6	6 35	27.5	36 30	32.4
6 46	17.7	37 17	22.7	7 12	27.6	37 7	32.5
7 23	17.8	37 54	22.8	7 49	27.7	37 43	32.6
7 59	17.9	38 31	22.9	8 25	27.8	38 20	32.7
				9 2	27.9	38 56	32.8
8 36	3 18.0	39 7	3 23.0			39 33	32.9
9 13	18.1	39 44	23.1	9 38	3 28.0		
9 49	18.2	40 20	23.2	10 15	28.1	40 10	3 33.0
10 26	18.3	40 57	23.3	10 52	28.2	40 46	33.1
11 2	18.4	41 34	23.4	11 28	28.3	41 23	33.2
11 39	18.5	42 10	23.5	12 5	28.4	42 0	33.3
12 16	18.6	42 47	23.6	12 42	28.5	42 36	33.4
12 52	18.7	43 24	23.7	13 18	28.6	43 13	33.5
13 29	18.8	44 0	23.8	13 55	28.7	43 49	33.6
14 6	18.9	44 37	23.9	14 31	28.8	44 26	33.7
				15 8	28.9	45 3	33.8
14 42	3 19.0	45 13	3 24.0			45 39	33.9
15 19	19.1	45 50	24.1	15 45	3 29.0		
15 55	19.2	46 27	24.2	16 21	29.1	46 16	3 34.0
16 32	19.3	47 3	24.3	16 58	29.2	46 53	34.1
17 9	19.4	47 40	24.4	17 35	29.3	47 29	34.2
17 45	19.5	48 17	24.5	18 11	29.4	48 6	34.3
18 22	19.6	48 53	24.6	18 48	29.5	48 42	34.4
18 59	19.7	49 30	24.7	19 24	29.6	49 19	34.5
19 35	19.8	50 6	24.8	20 1	29.7	49 56	34.6
20 12	19.9	50 43	24.9	20 38	29.8	50 32	34.7
				21 14	29.9	51 9	34.8
20 48	3 20.0	51 20	3 25.0			51 46	34.9
21 25	20.1	51 56	25.1	21 51	3 30.0		
22 2	20.2	52 33	25.2	22 28	30.1	52 22	3 35.0
22 38	20.3	53 10	25.3	23 4	30.2	52 59	35.1
23 15	20.4	53 46	25.4	23 41	30.3	53 35	35.2
23 52	20.5	54 23	25.5	24 17	30.4	54 12	35.3
24 28	20.6	54 59	25.6	24 54	30.5	54 49	35.4
25 5	20.7	55 36	25.7	25 31	30.6	55 25	35.5
25 41	20.8	56 13	25.8	26 7	30.7	56 2	35.6
26 18	20.9	56 49	25.9	26 44	30.8	56 39	35.7
				27 20	30.9	57 15	35.8
26 55	3 21.0	57 26	3 26.0			57 52	35.9
27 31	21.1	58 3	26.1	27 57	3 31.0		
28 8	21.2	58 39	26.2	28 34	31.1	58 28	3 36.0
28 45	21.3	59 16	26.3	29 10	31.2	59 5	36.1
29 21	21.4	59 52	26.4	29 47	31.3	59 42	36.2
29 58	21.5						

22h				23h			
St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.
0m 18s	3m 36s.3	30m 13s	3m 41s.2	0m 7s	3m 46s.1	30m 2s	3m 51s.0
0 55	36.4	30 50	41.3	0 44	46.2	30 39	51.1
1 31	36.5	31 26	41.4	1 21	46.3	31 15	51.2
2 8	36.6	32 3	41.5	1 57	46.4	31 52	51.3
2 45	36.7	32 39	41.6	2 34	46.5	32 28	51.4
3 21	36.8	33 16	41.7	3 11	46.6	33 5	51.5
3 58	36.9	33 53	41.8	3 47	46.7	33 42	51.6
		34 29	41.9	4 24	46.8	34 18	51.7
4 35	3 37.0			5 0	46.9	34 55	51.8
5 11	37.1	35 6	3 42.0			35 32	51.9
5 48	37.2	35 42	42.1	5 37	3 47.0		
6 24	37.3	36 19	42.2	6 14	47.1	36 8	3 52.0
7 1	37.4	36 56	42.3	6 50	47.2	36 45	52.1
7 38	37.5	37 32	42.4	7 27	47.3	37 21	52.2
8 14	37.6	38 9	42.5	8 4	47.4	37 58	52.3
8 51	37.7	38 46	42.6	8 40	47.5	38 35	52.4
9 28	37.8	39 22	42.7	9 17	47.6	39 11	52.5
10 4	37.9	39 59	42.8	9 53	47.7	39 48	52.6
		40 35	42.9	10 30	47.8	40 25	52.7
10 41	3 38.0			11 7	47.9	41 1	52.8
11 17	38.1	41 12	3 43.0			41 38	52.9
11 54	38.2	41 49	43.1	11 43	3 48.0		
12 31	38.3	42 25	43.2	12 20	48.1	42 14	3 53.0
13 7	38.4	43 2	43.3	12 57	48.2	42 51	53.1
13 44	38.5	43 39	43.4	13 33	48.3	43 28	53.2
14 21	38.6	44 15	43.5	14 10	48.4	44 4	53.3
14 57	38.7	44 52	43.6	14 46	48.5	44 41	53.4
15 34	38.8	45 28	43.7	15 23	48.6	45 18	53.5
16 10	38.9	46 5	43.8	16 0	48.7	45 54	53.6
		46 42	43.9	16 36	48.8	46 31	53.7
16 47	3 39.0			17 13	48.9	47 7	53.8
17 24	39.1	47 18	3 44.0			47 44	53.9
18 0	39.2	47 55	44.1	17 50	3 49.0		
18 37	39.3	48 32	44.2	18 26	49.1	48 21	3 54.0
19 14	39.4	49 8	44.3	19 3	49.2	48 57	54.1
19 50	39.5	49 45	44.4	19 39	49.3	49 34	54.2
20 27	39.6	50 21	44.5	20 16	49.4	50 11	54.3
21 3	39.7	50 58	44.6	20 53	49.5	50 47	54.4
21 40	39.8	51 35	44.7	21 29	49.6	51 24	54.5
22 17	39.9	52 11	44.8	22 6	49.7	52 0	54.6
		52 48	44.9	22 43	49.8	52 37	54.7
22 53	3 40.0			23 19	49.9	53 14	54.8
23 30	40.1	53 25	3 45.0			53 50	54.9
24 7	40.2	54 1	45.1	23 56	3 50.0		
24 43	40.3	54 38	45.2	24 32	50.1	54 27	3 55.0
25 20	40.4	55 14	45.3	25 9	50.2	55 4	55.1
25 56	40.5	55 51	45.4	25 46	50.3	55 40	55.2
26 33	40.6	56 28	45.5	26 22	50.4	56 17	55.3
27 10	40.7	57 4	45.6	26 59	50.5	56 53	55.4
27 46	40.8	57 41	45.7	27 36	50.6	57 30	55.5
28 23	40.9	58 18	45.8	28 12	50.7	58 7	55.6
		58 54	45.9	28 49	50.8	58 43	55.7
29 0	3 41.0			29 25	50.9	59 20	55.8
29 36	41.1	59 31	3 46.0			59 57	55.9

4s	0s.01
7	0.02
11	0.03
15	0.04
18	0.05
22	0.06
26	0.07
29	0.08
33	0.09

3' 40''	0m6
4 16	0.7

24h				25h			
St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.	St. Zeit	Reduct.
0' 53m	3' 56m0	30' 28m	4' 0m9	0' 22m	4' 5m8	30' 17m	4' 10m7
1 10	56.1			0 59	5.9	30 54	10.8
1 46	56.2	31 4	4 1.0			31 30	10.9
2 23	56.3	31 41	1.1	1 36	4 6.0		
3 0	56.4	32 18	1.2	2 12	6.1	32 7	4 11.0
3 36	56.5	32 54	1.3	2 49	6.2	32 44	11.1
4 13	56.6	33 31	1.4	3 26	6.3	33 20	11.2
4 50	56.7	34 8	1.5	4 2	6.4	33 57	11.3
5 26	56.8	34 44	1.6	4 39	6.5	34 33	11.4
6 3	56.9	35 21	1.7	5 15	6.6	35 10	11.5
		35 57	1.8	5 52	6.7	35 47	11.6
6 39	3 57.0	36 34	1.9	6 29	6.8	36 23	11.7
7 16	57.1			7 5	6.9	37 0	11.8
7 53	57.2	37 11	4 2.0			37 37	11.9
8 29	57.3	37 47	2.1	7 42	4 7.0		
9 6	57.4	38 24	2.2	8 19	7.1	38 13	4 12.0
9 43	57.5	39 1	2.3	8 55	7.2	38 50	12.1
10 19	57.6	39 37	2.4	9 32	7.3	39 26	12.2
10 56	57.7	40 14	2.5	10 8	7.4	40 3	12.3
11 32	57.8	40 50	2.6	10 45	7.5	40 40	12.4
12 9	57.9	41 27	2.7	11 22	7.6	41 16	12.5
		42 4	2.8	11 58	7.7	41 53	12.6
12 46	3 58.0	42 40	2.9	12 35	7.8	42 30	12.7
13 22	58.1			13 12	7.9	43 6	12.8
13 59	58.2	43 17	4 3.0			43 43	12.9
14 36	58.3	43 54	3.1	13 48	4 8.0		
15 12	58.4	44 30	3.2	14 25	8.1	44 19	4 13.0
15 49	58.5	45 7	3.3	15 1	8.2	44 56	13.1
16 25	58.6	45 43	3.4	15 38	8.3	45 33	13.2
17 2	58.7	46 20	3.5	16 15	8.4	46 9	13.3
17 39	58.8	46 57	3.6	16 51	8.5	46 46	13.4
18 15	58.9	47 33	3.7	17 28	8.6	47 23	13.5
		48 10	3.8	18 5	8.7	47 59	13.6
18 52	3 59.0	48 46	3.9	18 41	8.8	48 36	13.7
19 29	59.1			19 18	8.9	49 12	13.8
20 5	59.2	49 23	4 4.0			49 49	13.9
20 42	59.3	50 0	4.1	19 54	4 9.0		
21 18	59.4	50 36	4.2	20 31	9.1	50 26	4 14.0
21 55	59.5	51 13	4.3	21 8	9.2	51 2	14.1
22 32	59.6	51 50	4.4	21 44	9.3	51 39	14.2
23 8	59.7	52 26	4.5	22 21	9.4	52 16	14.3
23 45	59.8	53 3	4.6	22 58	9.5	52 52	14.4
24 22	59.9	53 40	4.7	23 34	9.6	53 29	14.5
		54 16	4.8	24 11	9.7	54 5	14.6
24 58	4 0.0	54 53	4.9	24 47	9.8	54 42	14.7
25 35	0.1			25 24	9.9	55 19	14.8
26 11	0.2	55 29	4 5.0			55 55	14.9
26 48	0.3	56 6	5.1	26 1	4 10.0		
27 25	0.4	56 43	5.2	26 37	10.1	56 32	4 15.0
28 1	0.5	57 19	5.3	27 14	10.2	57 8	15.1
28 38	0.6	57 56	5.4	27 51	10.3	57 45	15.2
29 15	0.7	58 33	5.5	28 27	10.4	58 21	15.3
29 51	0.8	59 9	5.6	29 4	10.5	58 58	15.4
		59 46	5.7	29 40	10.6	59 35	15.5

	Stunden		Minuten		Secunden		Bruchtheile der Secunden	
	Mittlere Zeit	Sternzeit	Mittl. Zeit	Sternzeit	Mittl. Zeit	Sternzeit		
0	0 0''0000	0 0''0000	0''0000	0''0000	0''0000	0''0000	0''0	0''0000
1	0 9.8565	0 9.8296	0.1643	0.1638	0.0027	0.0027	0.1	0.0003
2	0 19.7130	0 19.6591	0.3286	0.3277	0.0055	0.0055	0.2	0.0006
3	0 29.5694	0 29.4887	0.4928	0.4915	0.0082	0.0082	0.3	0.0008
4	0 39.4259	0 39.3182	0.6571	0.6553	0.0110	0.0109	0.4	0.0011
5	0 49.2824	0 49.1478	0.8214	0.8191	0.0137	0.0136	0.5	0.0014
6	0 59.1388	0 58.9774	0.9857	0.9830	0.0164	0.0164	0.6	0.0016
7	1 8.9953	1 8.8069	1.1499	1.1468	0.0192	0.0191	0.7	0.0019
8	1 18.8518	1 18.6365	1.3142	1.3106	0.0219	0.0218	0.8	0.0022
9	1 28.7083	1 28.4660	1.4785	1.4744	0.0246	0.0246	0.9	0.0025
10	1 38.5647	1 38.2956	1.6428	1.6383	0.0274	0.0273	1.0	0.0027
11	1 48.4212	1 48.1252	1.8070	1.8021	0.0301	0.0300		
12	1 58.2777	1 57.9547	1.9713	1.9659	0.0329	0.0328		
13	2 8.1342	2 7.7843	2.1356	2.1297	0.0356	0.0355		
14	2 17.9906	2 17.6138	2.2998	2.2936	0.0383	0.0382		
15	2 27.8471	2 27.4434	2.4641	2.4574	0.0411	0.0409		
16	2 37.7036	2 37.2730	2.6284	2.6212	0.0438	0.0437		
17	2 47.5600	2 47.1025	2.7927	2.7850	0.0465	0.0464		
18	2 57.4165	2 56.9321	2.9569	2.9489	0.0493	0.0491		
19	3 7.2730	3 6.7616	3.1212	3.1127	0.0520	0.0519		
20	3 17.1295	3 16.5912	3.2855	3.2765	0.0548	0.0546		
21	3 26.9859	3 26.4208	3.4498	3.4403	0.0575	0.0573		
22	3 36.8424	3 36.2503	3.6140	3.6042	0.0602	0.0601		
23	3 46.6989	3 46.0799	3.7783	3.7680	0.0630	0.0628		
24	3 56.5554	3 55.9094	3.9426	3.9318	0.0657	0.0655		
25			4.1069	4.0956	0.0685	0.0682		
26			4.2711	4.2595	0.0712	0.0710		
27			4.4354	4.4233	0.0739	0.0737		
28			4.5997	4.5871	0.0767	0.0764		
29			4.7640	4.7510	0.0794	0.0792		
30			4.9282	4.9148	0.0821	0.0819		
31			5.0925	5.0786	0.0849	0.0846		
32			5.2568	5.2424	0.0876	0.0874		
33			5.4211	5.4063	0.0904	0.0901		
34			5.5853	5.5701	0.0931	0.0928		
35			5.7496	5.7339	0.0958	0.0955		
36			5.9139	5.8977	0.0986	0.0983		
37			6.0782	6.0616	0.1013	0.1010		
38			6.2424	6.2254	0.1040	0.1037		
39			6.4067	6.3892	0.1068	0.1065		
40			6.5710	6.5530	0.1095	0.1092		
41			6.7353	6.7169	0.1123	0.1119		
42			6.8995	6.8807	0.1150	0.1147		
43			7.0638	7.0445	0.1177	0.1174		
44			7.2281	7.2083	0.1205	0.1201		
45			7.3924	7.3722	0.1232	0.1228		
46			7.5566	7.5360	0.1259	0.1256		
47			7.7209	7.6998	0.1287	0.1283		
48			7.8852	7.8636	0.1314	0.1310		
49			8.0495	8.0275	0.1342	0.1338		
50			8.2137	8.1913	0.1369	0.1365		
51			8.3780	8.3551	0.1396	0.1392		
52			8.5423	8.5190	0.1424	0.1420		
53			8.7066	8.6828	0.1451	0.1447		
54			8.8708	8.8466	0.1479	0.1474		
55			9.0351	9.0104	0.1506	0.1501		
56			9.1994	9.1743	0.1533	0.1529		
57			9.3637	9.3381	0.1561	0.1556		
58			9.5279	9.5019	0.1588	0.1583		
59			9.6922	9.6657	0.1615	0.1611		
60			9.8565	9.8296	0.1643	0.1638		

Hunderttheile des Tages.

0t 01	0h	14′	24″	0t 34	8h	9′	36″	0t 67	16h	4′	48″
0.02	0	28	48	0.35	8	24	0	0.68	16	19	12
0.03	0	43	12					0.69	16	33	36
0.04	0	57	36	0.36	8	38	24	0.70	16	48	0
0.05	1	12	0	0.37	8	52	48				
				0.38	9	7	12	0.71	17	2	24
0.06	1	26	24	0.39	9	21	36	0.72	17	16	48
0.07	1	40	48	0.40	9	36	0	0.73	17	31	12
0.08	1	55	12					0.74	17	45	36
0.09	2	9	36	0.41	9	50	24	0.75	18	0	0
0.10	2	24	0	0.42	10	4	48				
				0.43	10	19	12	0.76	18	14	24
0.11	2	38	24	0.44	10	33	36	0.77	18	28	48
0.12	2	52	48	0.45	10	48	0	0.78	18	43	12
0.13	3	7	12					0.79	18	57	36
0.14	3	21	36	0.46	11	2	24	0.80	19	12	0
0.15	3	36	0	0.47	11	16	48				
				0.48	11	31	12	0.81	19	26	24
0.16	3	50	24	0.49	11	45	36	0.82	19	40	48
0.17	4	4	48	0.50	12	0	0	0.83	19	55	12
0.18	4	19	12					0.84	20	9	36
0.19	4	33	36	0.51	12	14	24	0.85	20	24	0
0.20	4	48	0	0.52	12	28	28				
				0.53	12	43	12	0.86	20	38	24
0.21	5	2	24	0.54	12	57	36	0.87	20	52	48
0.22	5	16	48	0.55	13	12	0	0.88	21	7	12
0.23	5	31	12					0.89	21	21	36
0.24	5	45	36	0.56	13	26	24	0.90	21	36	0
0.25	6	0	0	0.57	13	40	48				
				0.58	13	55	12	0.91	21	50	24
0.26	6	14	24	0.59	14	9	36	0.92	22	4	48
0.27	6	28	48	0.60	14	24	0	0.93	22	19	12
0.28	6	43	12					0.94	22	33	36
0.29	6	57	36	0.61	14	38	24	0.95	22	48	0
0.30	7	12	0	0.62	14	52	48				
				0.63	15	7	12	0.96	23	2	24
0.31	7	26	24	0.64	15	21	36	0.97	23	16	48
0.32	7	40	48	0.65	15	36	0	0.98	23	31	12
0.33	7	55	12					0.99	23	45	36
				0.66	15	50	24				

Zehntausendtheile des Tages.

ot 00		ot 00		ot 00	
01	0′ 8″64	34	4′ 53″76	67	9′ 38″88
02	0 17.28	35	5 2.40	68	9 47.52
03	0 25.92			69	9 56.16
04	0 34.56	36	5 11.04	70	10 4.80
05	0 43.20	37	5 19.68		
		38	5 28.32	71	10 13.44
06	0 51.84	39	5 36.96	72	10 22.08
07	1 0.48	40	5 45.60	73	10 30.72
08	1 9.12			74	10 39.36
09	1 17.76	41	5 54.24	75	10 48.00
10	1 26.40	42	6 2.88		
		43	6 11.52	76	10 56.64
11	1 35.04	44	6 20.16	77	11 5.28
12	1 43.68	45	6 28.80	78	11 13.92
13	1 52.32			79	11 22.56
14	2 0.96	46	6 37.44	80	11 31.20
15	2 9.60	47	6 46.08		
		48	6 54.72	81	11 39.84
16	2 18.24	49	7 3.36	82	11 48.48
17	2 26.88	50	7 12.00	83	11 57.12
18	2 35.52			84	12 5.76
19	2 44.16	51.	7 20.64	85	12 14.40
20	2 52.80	52	7 29.28		
		53	7 37.92	86	12 23.04
21	3 1.44	54	7 46.56	87	12 31.68
22	3 10.08	55	7 55.20	88	12 40.32
23	3 18.72			89	12 48.96
24	3 27.36	56	8 3.84	90	12 57.60
25	3 36.00	57	8 12.48		
		58	8 21.12	91	13 6.24
26	3 44.64	59	8 29.76	92	13 14.88
27	3 53.28	60	8 38.40	93	13 23.52
28	4 1.92			94	13 32.16
29	4 10.56	61	8 47.04	95	13 40.80
30	4 19.20	62	8 55.68		
		63	9 4.32	96	13 49.44
31	4.27.84	64	9 12.96	97	13 58.08
32	4.36.48	65	9 21.60	98	14 6.72
33	4.45.12			99	14 15.36
		66	9 30.24		

Hunderttausendtheile.

ot 0000	
0	0″000
1	0.864
2	1.728
3	2.592
4	3.456
5	4.320
6	5.184
7	6.048
8	6.912
9	7.776

Milliontheile.

ot 00000	
0	0″0000
1	0.0864
2	0.1728
3	0.2592
4	0.3456
5	0.4320
6	0.5184
7	0.6048
8	0.6912
9	0.7776

Grade.				Minuten.				Secunden.			
1°	0h 4′	70°	4h40′	1′	0′ 4″	31′	2′ 4″	1″	0″07	31″	2″07
2	0 8	80	5 20	2	0 8	32	2 8	2	0.13	32	2.13
3	0 12	90	6 0	3	0 12	33	2 12	3	0.20	33	2.20
4	0 16	100	6 40	4	0 16	34	2 16	4	0.27	34	2.27
5	0 20	110	7 20	5	0 20	35	2 20	5	0.33	35	2.33
6	0 24	120	8 0	6	0 24	36	2 24	6	0.40	36	2.40
7	0 28	130	8 40	7	0 28	37	2 28	7	0.47	37	2.47
8	0 32	140	9 20	8	0 32	38	2 32	8	0.53	38	2.53
9	0 36	150	10 0	9	0 36	39	2 36	9	0.60	39	2.60
10	0 40	160	10 40	10	0 40	40	2 40	10	0.67	40	2.67
11	0 44	170	11 20	11	0 44	41	2 44	11	0.73	41	2.73
12	0 48	180	12 0	12	0 48	42	2 48	12	0.80	42	2.80
13	0 52	190	12 40	13	0 52	43	2 52	13	0.87	43	2.87
14	0 56	200	13 20	14	0 56	44	2 56	14	0.93	44	2.93
15	1 0	210	14 0	15	1 0	45	3 0	15	1.00	45	3.00
16	1 4	220	14 40	16	1 4	46	3 4	16	1.07	46	3.07
17	1 8	230	15 20	17	1 8	47	3 8	17	1.13	47	3.13
18	1 12	240	16 0	18	1 12	48	3 12	18	1.20	48	3.20
19	1 16	250	16 40	19	1 16	49	3 16	19	1.27	49	3.27
20	1 20	260	17 20	20	1 20	50	3 20	20	1.33	50	3.33
21	1 24	270	18 0	21	1 24	51	3 24	21	1.40	51	3.40
22	1 28	280	18 40	22	1 28	52	3 28	22	1.47	52	3.47
23	1 32	290	19 20	23	1 32	53	3 32	23	1.53	53	3.53
24	1 36	300	20 0	24	1 36	54	3 36	24	1.60	54	3.60
26	1 44	310	20 40	25	1 40	55	3 40	25	1.67	55	3.67
28	1 52	320	21 20	26	1 44	56	3 44	26	1.73	56	3.73
30	2 0	330	22 0	27	1 48	57	3 48	27	1.80	57	3.80
40	2 40	340	22 40	28	1 52	58	3 52	28	1.87	58	3.87
50	3 20	350	23 20	29	1 56	59	3 56	29	1.93	59	3.93
60	4 0	360	24 0	30	2 0	60	4 0	30	2.00	60	4.00

Stunden.		Minuten.				Secunden.					
1h	15°	1′	0°15′	31′	7°45′	1″	0′ 15″	31″	7′ 45″	0″·01	0″·15
2	30	2	0 30	32	8 0	2	0 30	32	8 0	0.02	0.30
3	45	3	0 45	33	8 15	3	0 45	33	8 15	0.03	0.45
4	60	4	1 0	34	8 30	4	1 0	34	8 30	0.04	0.60
5	75	5	1 15	35	8 45	5	1 15	35	8 45	0.05	0.75
6	90	6	1 30	36	9 0	6	1 30	36	9 0	0.06	0.90
7	105	7	1 45	37	9 15	7	1 45	37	9 15	0.07	1.05
8	120	8	2 0	38	9 30	8	2 0	38	9 30	0.08	1.20
9	135	9	2 15	39	9 45	9	2 15	39	9 45	0.09	1.35
10	150	10	2 30	40	10 0	10	2 30	40	10 0	0.10	1.50
11	165	11	2 45	41	10 15	11	2 45	41	10 15	0.11	1.65
12	180	12	3 0	42	10 30	12	3 0	42	10 30	0.12	1.80
13	195	13	3 15	43	10 45	13	3 15	43	10 45	0.13	1.95
14	210	14	3 30	44	11 0	14	3 30	44	11 0	0.14	2.10
15	225	15	3 45	45	11 15	15	3 45	45	11 15	0.15	2.25
16	240	16	4 0	46	11 30	16	4 0	46	11 30	0.16	2.40
17	255	17	4 15	47	11 45	17	4 15	47	11 45	0.17	2.55
18	270	18	4 30	48	12 0	18	4 30	48	12 0	0.18	2.70
19	285	19	4 45	49	12 15	19	4 45	49	12 15	0.19	2.85
20	300	20	5 0	50	12 30	20	5 0	50	12 30	0.20	3.00
21	315	21	5 15	51	12 45	21	5 15	51	12 45	0. 1	1. 5
22	330	22	5 30	52	13 0	22	5 30	52	13 0	0. 2	3. 0
23	345	23	5 45	53	13 15	23	5 45	53	13 15	0. 3	4. 5
24	360	24	6 0	54	13 30	24	6 0	54	13 30	0. 4	6. 0
25	375	25	6 15	55	13 45	25	6 15	55	13 45	0. 5	7. 5
26	390	26	6 30	56	14 0	26	6 30	56	14 0	0. 6	9. 0
27	405	27	6 45	57	14 15	27	6 45	57	14 15	0. 7	10. 5
28	420	28	7 0	58	14 30	28	7 0	58	14 30	0. 8	12. 0
29	435	29	7 15	59	14 45	29	7 15	59	14 45	0. 9	13. 5
30	450	30	7 30	60	15 0	30	7 30	60	15 0	1. 0	15. 0

Grade.

1	0.0174533	31°	0.5410521	61°	1.0646508	95°	1.6580628
2	0.0349066	32	0.5585054	62	1.0821041	100	1.7453293
3	0.0523599	33	0.5759587	63	1.0995574	105	1.8325957
4	0.0698132	34	0.5934119	64	1.1170107	110	1.9198622
5	0.0872665	35	0.6108652	65	1.1344640	115	2.0071286
6	0.1047198	36	0.6283185	66	1.1519173	120	2.0943951
7	0.1221730	37	0.6457718	67	1.1693706	130	2.2689280
8	0.1396263	38	0.6632251	68	1.1868239	140	2.4434610
9	0.1570796	39	0.6806784	69	1.2042772	150	2.6179939
10	0.1745329	40	0.6981317	70	1.2217305	160	2.7925268
11	0.1919862	41	0.7155850	71	1.2391838	170	2.9670597
12	0.2094395	42	0.7330383	72	1.2566371	180	3.1415927
13	0.2268928	43	0.7504916	73	1.2740904	190	3.3161256
14	0.2443461	44	0.7679449	74	1.2915436	200	3.4906585
15	0.2617994	45	0.7853982	75	1.3089969	210	3.6651914
16	0.2792527	46	0.8028515	76	1.3264502	220	3.8397243
17	0.2967060	47	0.8203047	77	1.3439035	230	4.0142573
18	0.3141593	48	0.8377580	78	1.3613568	240	4.1887902
19	0.3316126	49	0.8552113	79	1.3788101	250	4.3633231
20	0.3490659	50	0.8726646	80	1.3962634	260	4.5378561
21	0.3665191	51	0.8901179	81	1.4137167	270	4.7123890
22	0.3839724	52	0.9075712	82	1.4311700	280	4.8869219
23	0.4014257	53	0.9250245	83	1.4486233	290	5.0614548
24	0.4188790	54	0.9424778	84	1.4660766	300	5.2359878
25	0.4363323	55	0.9599311	85	1.4835299	310	5.4105207
26	0.4537856	56	0.9773844	86	1.5009832	320	5.5850536
27	0.4712389	57	0.9948377	87	1.5184364	330	5.7595865
28	0.4886922	58	1.0122910	88	1.5358897	340	5.9341195
29	0.5061455	59	1.0297443	89	1.5533430	350	6.1086524
30	0.5235988	60	1.0471976	90	1.5707963	360	6.2831853

Minuten.				Secunden.			
1′	0.0002909	31′	0.0090175	1″	0.0000048	31″	0.0001503
2	0.0005818	32	0.0093084	2	0.0000097	32	0.0001551
3	0.0008727	33	0.0095993	3	0.0000145	33	0.0001600
4	0.0011636	34	0.0098902	4	0.0000194	34	0.0001648
5	0.0014544	35	0.0101811	5	0.0000242	35	0.0001697
6	0.0017453	36	0.0104720	6	0.0000291	36	0.0001745
7	0.0020362	37	0.0107629	7	0.0000339	37	0.0001794
8	0.0023271	38	0.0110538	8	0.0000388	38	0.0001842
9	0.0026180	39	0.0113446	9	0.0000436	39	0.0001891
10	0.0029089	40	0.0116355	10	0.0000485	40	0.0001939
11	0.0031998	41	0.0119264	11	0.0000533	41	0.0001988
12	0.0034907	42	0.0122173	12	0.0000582	42	0.0002036
13	0.0037815	43	0.0125082	13	0.0000630	43	0.0002085
14	0.0040724	44	0.0127991	14	0.0000679	44	0.0002133
15	0.0043633	45	0.0130900	15	0.0000727	45	0.0002182
16	0.0046542	46	0.0133809	16	0.0000776	46	0.0002230
17	0.0049451	47	0.0136717	17	0.0000824	47	0.0002279
18	0.0052360	48	0.0139626	18	0.0000873	48	0.0002327
19	0.0055269	49	0.0142535	19	0.0000921	49	0.0002376
20	0.0058178	50	0.0145444	20	0.0000970	50	0.0002424
21	0.0061087	51	0.0148353	21	0.0001018	51	0.0002473
22	0.0063995	52	0.0151262	22	0.0001067	52	0.0002521
23	0.0066904	53	0.0154171	23	0.0001115	53	0.0002570
24	0.0069813	54	0.0157080	24	0.0001164	54	0.0002618
25	0.0072722	55	0.0159989	25	0.0001212	55	0.0002666
26	0.0075631	56	0.0162897	26	0.0001261	56	0.0002715
27	0.0078540	57	0.0165806	27	0.0001309	57	0.0002763
28	0.0081449	58	0.0168715	28	0.0001357	58	0.0002812
29	0.0084358	59	0.0171624	29	0.0001406	59	0.0002860
30	0.0087266	60	0.0174533	30	0.0001454	60	0.0002909

Scheinb. Zenithdistanz.	Refraction.		Scheinb. Zenithdistanz.	Refraction.		Scheinb. Zenithdistanz.	Refraction.	
0°	0″0	4″1	48° 0′	1′ 4″0	0″7	62° 0′	1′ 48″2	1″5
4	4.1	4.0	20	1 4.7	0.8	20	1 49.7	1.5
8	8.1	1.0	40	1 5.5	0.8	40	1 51.2	1.6
9	9.1	1.1	49 0	1 6.3	0.8	63 0	1 52.8	1.6
10	10.2	1.0	20	1 7.1	0.8	20	1 54.4	1.7
11	11.2	1.1	40	1 7.9	0.8	40	1 56.1	1.7
12	12.3	1.1	50 0	1 8.7	0.8	64 0	1 57.8	1.8
13	13.4	1.1	20	1 9.5	0.8	20	1 59.6	1.8
14	14.5	1.0	40	1 10.3	0.9	40	2 1.4	1.8
15	15.5	1.1	51 0	1 11.2	0.8	65 0	2 3.2	1.9
16	16.6	1.1	20	1 12.0	0.9	20	2 5.1	1.9
17	17.7	1.1	40	1 12.9	0.9	40	2 7.0	1.9
18	18.8	1.1	52 0	1 13.8	0.9	66 0	2 8.9	2.0
19	19.9	1.1	20	1 14.7	0.9	20	2 10.9	2.1
20	21.0	1.2	40	1 15.6	0.9	40	2 13.0	2.2
21	22.2	1.1	53 0	1 16.5	0.9	67 0	2 15.2	2.2
22	23.3	1.2	20	1 17.4	0.9	20	2 17.4	2.2
23	24.5	1.2	40	1 18.3	1.0	40	2 19.6	2.3
24	25.7	1.2	54 0	1 19.3	1.0	68 0	2 21.9	2.4
25	26.9	1.3	20	1 20.3	1.0	20	2 24.3	2.5
26	28.2	1.2	40	1 21.3	1.0	40	2 26.8	2.5
27	29.4	1.3	55 0	1 22.3	1.0	69 0	2 29.3	2.6
28	30.7	1.3	20	1 23.3	1.0	20	2 31.9	2.6
29	32.0	1.3	40	1 24.3	1.1	40	2 34.5	2.8
30	33.3	1.4	56 0	1 25.4	1.1	70 0	2 37.3	2.9
31	34.7	1.4	20	1 26.5	1.1	20	2 40.2	2.9
32	36.1	1.4	40	1 27.6	1.1	40	2 43.1	3.0
33	37.5	1.4	57 0	1 28.7	1.1	71 0	2 46.1	3.2
34	38.9	1.5	20	1 29.8	1.1	20	2 49.3	3.2
35	40.4	1.5	40	1 30.9	1.2	40	2 52.5	3.3
36	41.9	1.6	58 0	1 32.1	1.2	72 0	2 55.8	3.5
37	43.5	1.6	20	1 33.3	1.2	20	2 59.3	3.6
38	45.1	1.6	40	1 34.5	1.3	40	3 2.9	3.7
39	46.7	1.7	59 0	1 35.8	1.3	73 0	3 6.6	3.9
40	48.4	1.8	20	1 37.1	1.3	20	3 10.5	4.0
41	50.2	1.7	40	1 38.4	1.3	40	3 14.5	4.1
42	51.9	1.9	60 0	1 39.7	1.3	74 0	3 18.6	4.3
43	53.8	1.9	20	1 41.0	1.4	20	3 22.9	4.5
44	55.7	2.0	40	1 42.4	1.4	40	3 27.4	4.7
45	57.7	2.0	61 0	1 43.8	1.5	75 0	3 32.1	4.9
46	59.7	2.1	20	1 45.3	1.4	20	3 37.0	5.1
47	61.8	2.2	40	1 46.7	1.5	40	3 42.1	5.3
48	64.0		62 0	1 48.2		76 0	3 47.4	

Scheinb. Zenithdistanz.	Refraction.		Scheinb. Zenithdistanz.	Refraction.	
76° 0′	3′ 47″4	2″8	83° 0′	7′ 19″7	9″5
10	3 50.2	2.8	10	7 29.2	10.0
20	3 53.0	2.9	20	7 39.2	10.3
30	3 55.9	2.9	30	7 49.5	10.8
40	3 58.8	3.0	40	8 0.3	11.3
50	4 1.8	3.1	50	8 11.6	11.7
77 0	4 4.9	3.2	84 0	8 23.3	12.3
10	4 8.1	3.2	10	8 35.6	12.8
20	4 11.3	3.3	20	8 48.4	13.5
30	4 14.6	3.4	30	9 1.9	14.1
40	4 18.0	3.4	40	9 16.0	14.9
50	4 21.4	3.6	50	9 30.9	15.6
78 0	4 25.0	3.7	85 0	9 46.5	16.8
10	4 28.7	3.7	10	10 3.3	17.9
22	4 32.4	3.9	20	10 21.2	18.4
30	4 36.3	3.9	30	10 39.6	19.0
40	4 40.2	4.1	40	10 58.6	19.7
50	4 44.3	4.2	50	11 18.3	20.6
79 0	4 48.5	4.3	86 0	11 38.9	21.8
10	4 52.8	4.4	10	12 0.7	23.0
20	4 57.2	4.5	20	12 23.7	24.6
30	5 1.7	4.7	30	12 48.3	26.7
40	5 6.4	4.8	40	13 15.0	28.7
50	5 11.2	5.0	50	13 43.7	30.9
80 0	5 16.2	5.1	87 0	14 14.6	33.2
10	5 21.3	5.2	10	14 47.8	35.6
20	5 26.5	5.5	20	15 23.4	37.5
30	5 32.0	5.6	30	16 0.9	39.8
40	5 37.6	5.7	40	16 40.7	42.3
50	5 43.3	6.0	50	17 23.0	45.6
81 0	5 49.3	6.1	88 0	18 8.6	49.4
10	5 55.4	6.2	10	18 58.0	53.9
20	6 1.8	6.6	20	19 51.9	59.0
30	6 8.4	6.8	30	20 50.9	64.7
40	6 15.2	7.1	40	21 55.6	71.1
50	6 22.3	7.3	50	23 6.7	77.9
82 0	6 29.6	7.6	89 0	24 24.6	85.2
10	6 37.2	7.9	10	25 49.8	92.9
20	6 45.1	8.2	20	27 22.7	100.8
30	6 53.3	8.4	30	29 3.5	108.8
40	7 1.7	8.8	40	30 52.3	116.9
50	7 10.5	9.2	50	32 49.2	124.9
83 0	7 19.7		90 0	34 54.1	

′	0°		1°		2°		3°		4°		′
0	—		0.0035	72	0.3046	36	0.4810	24	0.6062	18	0
1	8.23	30	0.0107	70	0.3082	36	0.4834	24	0.6080	18	1
2	8.53	17	0.0177	70	0.3118	36	0.4858	24	0.6098	18	2
3	8.70	13	0.0247	68	0.3154	35	0.4882	24	0.6116	18	3
4	8.83	9	0.0315	67	0.3189	35	0.4906	23	0.6134	18	4
5	8.92		0.0382	67	0.3224	34	0.4929	23	0.6152	18	5
6	9.003	67	0.0449	65	0.3258	35	0.4952	24	0.6170	17	6
7	9.070	58	0.0514	64	0.3293	34	0.4976	23	0.6187	18	7
8	9.128	52	0.0578	64	0.3327	34	0.4999	23	0.6205	17	8
9	9.180	45	0.0642	62	0.3361	34	0.5022	23	0.6222	18	9
10	9.225	42	0.0704	62	0.3395	33	0.5045	23	0.6240	17	10
11	9.267	37	0.0766	61	0.3428	33	0.5068	22	0.6257	18	11
12	9.304	35	0.0827	60	0.3461	33	0.5090	23	0.6275	17	12
13	9.339	32	0.0887	59	0.3494	32	0.5113	23	0.6292	17	13
14	9.371	30	0.0946	58	0.3526	32	0.5136	22	0.6309	17	14
15	9.401	28	0.1004	58	0.3558	32	0.5158	22	0.6326	17	15
16	9.429	27	0.1062	56	0.3590	32	0.5180	22	0.6343	17	16
17	9.456	25	0.1118	57	0.3622	32	0.5202	22	0.6360	17	17
18	9.481	23	0.1175	55	0 3654	31	0.5224	22	0.6377	17	18
19	9.504	22	0.1230	54	0.3685	31	0.5246	22	0.6394	17	19
20	9.526	22	0.1284	54	0.3716	31	0.5268	22	0.6411	17	20
21	9.548	20	0.1338	54	0.3747	31	0.5290	22	0.6428	16	21
22	9.568	19	0.1392	52	0.3778	31	0.5312	21	0.6444	17	22
23	9.587	18	0.1444	52	0.3809	30	0.5333	21	0.6461	16	23
24	9 605	18	0.1496	52	0.3839	30	0.5354	22	0.6477	17	24
25	9.623	17	0.1548	51	0.3869	30	0.5376	21	0.6494	16	25
26	9.640	17	0.1599	50	0.3899	30	0.5397	21	0.6510	17	26
27	9.657	16	0.1649	50	0.3929	29	0.5418	21	0.6527	16	27
28	9.673	15	0.1699	49	0.3958	29	0.5439	21	0.6543	16	28
29	9.688	14	0.1748	48	0.3987	29	0.5460	20	0.6559	16	29
30	9.702	15	0.1796	48	0.4016	29	0.5480	21	0.6575	16	30
31	9.717	13	0.1844	48	0.4045	29	0.5501	21	0.6591	16	31
32	9.730	14	0.1892	47	0.4074	29	0.5522	20	0.6607	16	32
33	9.744	13	0.1939	46	0.4103	28	0.5542	21	0.6623	16	33
34	9.757	12	0.1985	46	0.4131	28	0.5563	20	0.6639	16	34
35	9.769	13	0.2031	46	0.4159	28	0.5583	20	0.6655	16	35
36	9.782	11	0.2077	45	0.4187	28	0.5603	20	0.6671	16	36
37	9.793	12	0.2122	44	0.4215	28	0.5623	20	0.6687	15	37
38	9.805	11	0.2166	44	0.4243	27	0.5643	20	0.6702	16	38
39	9.816	11	0.2210	44	0.4270	27	0.5663	20	0.6718	16	39
40	9.827	11	0.2254	43	0.4297	27	0.5683	19	0.6734	16	40
41	9.838	11	0.2297	43	0.4324	27	0.5702	20	0.6750	15	41
42	9.849	10	0.2340	42	0.4351	27	0.5722	20	0.6765	16	42
43	9.859	10	0.2382	42	0.4378	27	0.5742	19	0 6781	15	43
44	9.869	10	0.2424	42	0.4405	26	0.5761	20	0.6796	15	44
45	9.879	9	0.2466	41	0.4431	26	0.5781	20	0.6811	16	45
46	9.988	9	0.2507	41	0.4457	26	0.5801	19	0.6827	15	46
47	9.897	10	0.2548	40	0.4483	26	0.5820	19	0.6842	15	47
48	9.907	8	0.2588	40	0.4509	26	0.5839	19	0 6857	15	48
49	9.915	9	0.2628	40	0.4535	26	0.5858	19	0.6872	15	49
50	9.924	9	0.2668	40	0.4561	25	0.5877	19	0.6887	15	50
51	9.933	8	0.2708	39	0.4586	26	0.5896	18	0.6902	15	51
52	9.941	9	0.2747	39	0.4612	25	0.5914	19	0.6917	15	52
53	9.950	8	0.2786	38	0.4637	25	0.5933	19	0.6932	15	53
54	9.958	8	0.2824	38	0.4662	25	0.5952	18	0.6947	15	54
55	9.966	7	0.2862	37	0.4687	25	0.5970	19	0.6962	14	55
56	9.973	8	0.2899	37	0.4712	24	0.5989	18	0.6976	15	56
57	9.981	8	0.2936	37	0.4736	25	0.6007	19	0.6991	14	57
58	9.989	7	0.2973	37	0.4761	25	0.6026	18	0.7005	15	58
59	9.996	7	0.3010	36	0.4786	24	0.6044	18	0.7020	15	59
60	0.003		0.3046		0.4810		0.6062		0.7035		60

′	5°		6°		7°		8°		9°		′
0	0.7035	14	0.7832	12	0.8507	10	0.9093	10	0.9613	8	0
1	0.7049	14	0.7844	12	0.8517	11	0.9103	9	0.9621	8	1
2	0.7064	15	0.7856	12	0.8528	10	0.9112	9	0.9629	9	2
3	0.7078	14	0.7868	12	0.8538	11	0.9121	9	0.9638	8	3
4	0.7092	14	0.7880	12	0.8549	10	0.9130	9	0.9646	8	4
5	0.7107	15	0.7892	12	0.8559	10	0.9139	9	0.9654	8	5
6	0.7121	14	0.7904	12	0.8569	10	0.9148	9	0.9662	8	6
7	0.7135	14	0.7916	12	0.8580	11	0.9157	9	0.9670	8	7
8	0.7150	15	0.7928	12	0.8590	10	0.9166	9	0.9678	8	8
9	0.7164	14	0.7940	12	0.8600	10	0.9175	9	0.9686	8	9
10	0.7178	14	0.7952	12	0.8610	10	0.9184	9	0.9694	8	10
11	0.7192	14	0.7963	11	0.8620	10	0.9193	9	0.9702	8	11
12	0.7206	14	0.7975	12	0.8631	11	0.9202	9	0.9710	8	12
13	0.7220	14	0.7987	12	0.8641	10	0.9211	9	0.9718	8	13
14	0.7234	14	0.7999	12	0.8651	10	0.9220	9	0.9726	8	14
15	0.7248	14	0.8010	11	0.8661	10	0.9229	9	0.9733	7	15
16	0.7261	13	0.8022	12	0.8671	10	0.9237	9	0.9741	8	16
17	0.7275	14	0.8034	12	0.8681	10	0.9246	9	0.9749	8	17
18	0.7289	14	0.8045	11	0.8691	10	0.9255	9	0.9757	8	18
19	0.7303	14	0.8057	12	0.8701	10	0.9264	9	0.9765	8	19
20	0.7317	14	0.8068	11	0.8711	10	0.9273	9	0.9773	8	20
21	0.7331	14	0.8080	12	0.8721	10	0.9282	9	0.9781	8	21
22	0.7344	13	0.8091	11	0.8731	10	0.9290	8	0.9788	7	22
23	0.7358	14	0.8103	12	0.8741	10	0.9299	9	0.9796	8	23
24	0.7371	13	0.8114	11	0.8751	10	0.9308	9	0.9804	8	24
25	0.7384	13	0.8125	11	0.8760	9	0.9317	9	0.9812	8	25
26	0.7398	14	0.8137	12	0.8770	10	0.9325	8	0.9819	7	26
27	0.7411	13	0.8148	11	0.8780	10	0.9334	9	0.9827	8	27
28	0.7424	13	0.8159	11	0.8790	10	0.9343	9	0.9835	8	28
29	0.7438	14	0.8171	12	0.8800	10	0.9352	9	0.9843	8	29
30	0.7451	13	0.8182	11	0.8810	10	0.9360	8	0.9851	8	30
31	0.7464	13	0.8193	11	0.8819	9	0.9369	9	0.9858	7	31
32	0.7477	13	0.8204	11	0.8829	10	0.9377	8	0.9866	8	32
33	0.7491	14	0.8216	12	0.8839	10	0.9386	9	0.9874	8	33
34	0.7504	13	0.8227	11	0.8849	10	0.9394	8	0.9882	8	34
35	0.7517	13	0.8238	11	0.8858	9	0.9403	9	0.9889	7	35
36	0.7530	13	0.8249	11	0.8868	10	0.9412	9	0.9897	8	36
37	0.7543	13	0.8260	11	0.8877	9	0.9420	8	0.9905	8	37
38	0.7556	13	0.8271	11	0.8887	10	0.9429	9	0.9912	7	38
39	0.7569	13	0.8282	11	0.8896	9	0.9437	8	0.9920	8	39
40	0.7582	13	0.8293	11	0.8906	10	0.9446	9	0.9928	8	40
41	0.7595	13	0.8304	11	0.8916	10	0.9454	8	0.9935	7	41
42	0.7607	12	0.8315	11	0.8925	9	0.9463	9	0.9943	8	42
43	0.7620	13	0.8325	10	0.8935	10	0.9471	8	0.9951	8	43
44	0.7633	13	0.8336	11	0.8944	9	0.9480	9	0.9958	7	44
45	0.7646	13	0.8347	11	0.8954	10	0.9488	8	0.9966	8	45
46	0.7658	12	0.8358	11	0.8963	9	0.9496	8	0.9974	8	46
47	0.7671	13	0.8368	10	0.8973	10	0.9505	9	0.9981	7	47
48	0.7684	13	0.8379	11	0.8982	9	0.9513	8	0.9989	8	48
49	0.7697	13	0.8390	11	0.8992	10	0.9522	9	0.9996	7	49
50	0.7709	12	0.8401	11	0.9001	9	0.9530	8	1.0004	8	50
51	0.7722	13	0.8412	11	0.9010	9	0.9538	8	1.0012	8	51
52	0.7734	12	0.8422	10	0.9020	10	0.9547	9	1.0019	7	52
53	0.7747	13	0.8433	11	0.9029	9	0.9555	8	1.0027	8	53
54	0.7759	12	0.8443	10	0.9038	9	0.9563	8	1.0034	7	54
55	0.7771	12	0.8454	11	0.9047	9	0.9572	9	1.0041	7	55
56	0.7783	12	0.8465	11	0.9057	10	0.9580	8	1.0049	8	56
57	0.7796	13	0.8475	10	0.9066	9	0.9588	8	1.0056	7	57
58	0.7808	12	0.8486	11	0.9075	9	0.9596	8	1.0064	8	58
59	0.7820	12	0.8496	10	0.9084	9	0.9605	9	1.0071	7	59
60	0.7832	12	0.8507	11	0.9093	9	0.9613	8	1.0079	8	60

′	10°		11°		12°		13°		14°		′
0	1.00786	74	1.05019	67	1.08901	62	1.12489	58	1.15830	54	0
1	1.00860	74	1.05086	68	1.08963	62	1.12547	57	1.15884	53	1
2	1.00934	74	1.05154	67	1.09025	61	1.12604	58	1.15937	53	2
3	1.01008	74	1.05221	67	1.09086	62	1.12662	57	1.15991	54	3
4	1.01082	74	1.05288	67	1.09148	61	1.12719	57	1.16044	53	4
5	1.01155	73	1.05355	67	1.09209	62	1.12776	57	1.16098	54	5
6	1.01228	73	1.05422	66	1.09271	62	1.12834	58	1.16151	53	6
7	1.01301	73	1.05488	67	1.09333	61	1.12891	57	1.16205	54	7
8	1.01374	73	1.05555	67	1.09394	62	1.12948	57	1.16258	53	8
9	1.01447	73	1.05622	66	1.09456	62	1.13005	57	1.16312	54	9
10	1.01519	72	1.05688	67	1.09518	61	1.13062	57	1.16365	53	10
11	1.01592	73	1.05755	66	1.09579	61	1.13119	57	1.16418	53	11
12	1.01664	72	1.05821	67	1.09640	62	1.13176	57	1.16471	53	12
13	1.01736	72	1.05888	66	1.09702	61	1.13232	56	1.16524	53	13
14	1.01809	73	1.05954	66	1.09763	61	1.13289	57	1.16577	53	14
15	1.01881	72	1.06020	66	1.09824	60	1.13346	57	1.16630	53	15
16	1.01953	72	1.06086	66	1.09884	61	1.13402	56	1.16683	53	16
17	1.02025	72	1.06152	65	1.09945	61	1.13459	57	1.16736	53	17
18	1.02097	72	1.06217	66	1.10006	61	1.13515	56	1.16788	52	18
19	1.02168	71	1.06283	66	1.10067	60	1.13572	57	1.16841	53	19
20	1.02240	72	1.06349	65	1.10127	60	1.13628	56	1.16894	53	20
21	1.02311	71	1.06414	65	1.10187	60	1.13684	56	1.16946	52	21
22	1.02383	72	1.06479	65	1.10247	61	1.13741	57	1.16999	53	22
23	1.02454	71	1.06545	66	1.10308	60	1.13797	56	1.17052	53	23
24	1.02525	71	1.06610	65	1.10368	60	1.13853	56	1.17104	52	24
25	1.02597	72	1.06675	65	1.10428	60	1.13909	56	1.17157	53	25
26	1.02668	71	1.06740	65	1.10489	61	1.13965	56	1.17209	52	26
27	1.02739	71	1.06805	65	1.10549	60	1.14021	56	1.17261	52	27
28	1.02810	71	1.06870	65	1.10609	60	1.14077	56	1.17314	53	28
29	1.02880	70	1.06935	65	1.10669	60	1.14132	55	1.17366	52	29
30	1.02951	71	1.07000	64	1.10729	60	1.14188	56	1.17418	52	30
31	1.03021	70	1.07064	65	1.10789	59	1.14244	56	1.17470	52	31
32	1.03092	71	1.07129	64	1.10848	60	1.14299	55	1.17522	52	32
33	1.03162	70	1.07193	65	1.10908	60	1.14354	55	1.17574	52	33
34	1.03232	70	1.07258	64	1.10968	59	1.14410	56	1.17626	52	34
35	1.03302	70	1.07322	64	1.11027	60	1.14465	55	1.17678	52	35
36	1.03372	70	1.07386	64	1.11087	59	1.14520	55	1.17730	52	36
37	1.03441	69	1.07450	64	1.11146	59	1.14575	55	1.17782	52	37
38	1.03511	70	1.07514	64	1.11205	59	1.14631	56	1.17833	51	38
39	1.03581	70	1.07578	64	1.11264	59	1.14686	55	1.17885	52	39
40	1.03650	69	1.07642	63	1.11323	59	1.14741	55	1.17937	52	40
41	1.03720	70	1.07705	64	1.11382	58	1.14796	55	1.17988	51	41
42	1.03789	69	1.07769	64	1.11440	59	1.14851	55	1.18040	52	42
43	1.03858	69	1.07833	63	1.11499	58	1.14906	55	1.18091	51	43
44	1.03927	69	1.07896	64	1.11557	59	1.14961	55	1.18143	52	44
45	1.03996	69	1.07960	63	1.11616	59	1.15016	55	1.18194	51	45
46	1.04065	68	1.08023	63	1.11675	58	1.15071	55	1.18245	51	46
47	1.04133	69	1.08086	63	1.11733	59	1.15125	54	1.18297	52	47
48	1.04202	69	1.08149	63	1.11792	58	1.15180	55	1.18348	51	48
49	1.04271	69	1.08212	63	1.11850	59	1.15234	54	1.18399	51	49
50	1.04339	68	1.08275	63	1.11909	58	1.15289	55	1.18450	51	50
51	1.04407	68	1.08337	62	1.11967	58	1.15343	54	1.18501	51	51
52	1.04476	69	1.08400	63	1.12025	58	1.15397	54	1.18552	51	52
53	1.04544	68	1.08463	63	1.12083	58	1.15452	55	1.18602	50	53
54	1.04612	68	1.08525	62	1.12141	58	1.15506	54	1.18653	51	54
55	1.04680	68	1.08588	63	1.12199	58	1.15560	54	1.18704	51	55
56	1.04748	68	1.08650	62	1.12257	58	1.15614	54	1.18755	51	56
57	1.04816	68	1.08713	63	1.12315	58	1.15668	54	1.18805	50	57
58	1.04883	67	1.08776	63	1.12373	58	1.15722	54	1.18855	51	58
59	1.04951	68	1.08838	62	1.12431	58	1.15776	54	1.18906	50	59
60	1.05019	68	1.08901	63	1.12489	58	1.15830	54	1.18957	51	60

′	15.°		16.°		17		18.°		19.°		′
0	1.18957	51	1.21901	48	1.24685	45	1.27328	43	1.29847	41	0
1	1.19008	50	1.21949	47	1.24730	46	1.27371	43	1.29888	41	1
2	1.19058	50	1.21996	48	1.24776	45	1.27414	42	1.29929	41	2
3	1.19108	51	1.22044	47	1.24821	45	1.27456	43	1.29970	41	3
4	1.19159	50	1.22091	48	1.24866	45	1.27499	43	1.30011	41	4
5	1.19209	50	1.22139	47	1.24911	45	1.27542	43	1.30052	41	5
6	1.19259	50	1.22186	48	1.24956	45	1.27585	43	1.30093	41	6
7	1.19309	51	1.22234	47	1.25001	45	1.27628	43	1.30134	41	7
8	1.19360	50	1.22281	48	1.25045	44	1.27670	42	1.30174	40	8
9	1.19410	50	1.22329	47	1.25090	45	1.27713	43	1.30215	41	9
10	1.19460	50	1.22376	47	1.25135	45	1.27756	43	1.30256	41	10
11	1.19510	50	1.22423	47	1.25180	45	1.27799	43	1.30297	41	11
12	1.19560	49	1.22470	47	1.25224	44	1.27841	42	1.30337	40	12
13	1.19609	50	1.22517	47	1.25269	45	1.27884	43	1.30378	41	13
14	1.19659	50	1.22564	47	1.25313	44	1.27926	42	1.30418	40	14
15	1.19709	50	1.22611	47	1.25358	45	1.27969	43	1.30459	41	15
16	1.19759	49	1.22658	47	1.25402	44	1.28011	42	1.30499	40	16
17	1.19808	50	1.22705	47	1.25447	45	1.28054	43	1.30540	41	17
18	1.19858	49	1.22751	46	1.25491	44	1.28096	42	1.30580	40	18
19	1.19907	50	1.22798	47	1.25536	45	1.28139	43	1.30621	41	19
20	1.19957	49	1.22845	47	1.25580	44	1.28181	42	1.30661	40	20
21	1.20006	50	1.22892	47	1.25624	44	1.28223	42	1.30701	40	21
22	1.20056	49	1.22939	47	1.25669	45	1.28266	43	1.30742	41	22
23	1.20105	50	1.22985	46	1.25713	44	1.28308	42	1.30782	40	23
24	1.20155	49	1.23032	47	1.25758	45	1.28350	42	1.30823	41	24
25	1.20204	49	1.23079	47	1.25802	44	1.28392	42	1.30863	40	25
26	1.20253	49	1.23126	47	1.25846	44	1.28434	42	1.30903	40	26
27	1.20302	49	1.23172	46	1.25890	44	1.28476	42	1.30944	41	27
28	1.20352	50	1.23219	47	1.25935	45	1.28518	42	1.30984	40	28
29	1.20401	49	1.23265	46	1.25979	44	1.28560	42	1.31024	40	29
30	1.20450	49	1.23312	47	1.26023	44	1.28602	42	1.31064	40	30
31	1.20499	49	1.23359	47	1.26067	44	1.28644	42	1.31104	40	31
32	1.20548	49	1.23405	46	1.26111	44	1.28686	42	1.31144	40	32
33	5.20597	49	1.23451	46	1.26155	44	1.28727	41	1.31184	40	33
34	1.20646	49	1.23498	47	1.26199	44	1.28769	42	1.31224	40	34
35	1.20695	49	1.23544	46	1.26243	44	1.28811	42	1.31264	40	35
36	1.20744	49	1.23590	46	1.26287	44	1.28853	42	1.31304	40	36
37	1.20793	48	1.23636	46	1.26331	44	1 28894	41	1.31344	40	37
38	1.20841	49	1.23682	46	1.26374	43	1.28936	42	1.31384	40	38
39	1.20890	49	1.23728	46	1.26418	44	1.28978	42	1.31424	40	39
40	1.20939	48	1.23774	46	1.26462	44	1.29020	42	1.31464	40	40
41	1.20987	49	1.23820	46	1.26505	43	1.29062	42	1.31504	40	41
42	1.21036	48	1.23866	46	1.26549	44	1.29103	41	1.31544	40	42
43	1.21084	49	1.23911	45	1.26592	43	1.29145	42	1.31583	39	43
44	1.21133	48	1.23957	46	1.26636	44	1.29186	41	1.31623	40	44
45	1.21181	48	1.24003	46	1.26679	43	1.29228	42	1.31663	40	45
46	1.21229	48	1.24049	46	1.26722	43	1.29269	41	1.31703	40	46
47	1.21277	49	1.24094	45	1.26766	44	1.29311	42	1.31742	39	47
48	1.21326	48	1.24140	46	1.26809	43	1.29352	41	1.31782	40	48
49	1.21374	48	1.24185	45	1.26853	44	1.29394	42	1.31821	39	49
50	1.21422	48	1.24231	46	1.26896	43	1.29435	41	1.31861	40	50
51	1.21470	48	1 24276	45	1.26939	43	1.29476	41	1.31901	40	51
52	1.21518	48	1.24322	46	1.26982	43	1.29517	41	1.31940	39	52
53	1.21566	48	1.24368	45	1.27026	44	1.29559	42	1 31980	40	53
54	1.21614	48	1.24413	46	1.27069	43	1.29600	41	1.32019	39	54
55	1.21662	48	1.24458	45	1.27112	43	1.29641	41	1.32059	40	55
56	1.21710	48	1.24503	45	1.27155	43	1.29682	41	1.32098	39	56
57	1.21758	47	1.24549	46	1.27198	43	1.29723	41	1.32138	40	57
58	1.21805	48	1.24594	45	1.27242	44	1.29765	42	1.32177	39	58
59	1.21853	48	1.24640	46	1.27285	43	1.29806	41	1.32217	40	59
60	1.21901		1.24685	45	1.27328	43	1.29847	41	1.32256	39	60

′	20°		21°		22°		23°		24°		′
0	1.32256		1.34566		1.36788		1.38932		1.41004		0
1	1.32295	39	1.34604	38	1.36824	36	1.38967	35	1.41038	34	1
2	1.32334	39	1.34641	37	1.36861	37	1.39002	35	1.41072	34	2
3	1.32373	39	1.34679	38	1.36897	36	1.39037	35	1.41106	34	3
4	1.32413	40	1.34716	37	1.36933	36	1.39072	35	1.41140	34	4
5	1.32452	39	1.34754	38	1.36970	37	1.39107	35	1.41173	33	5
		39		38		36		34		34	
6	1.32491	39	1.34792	37	1.37006	36	1.39141	35	1.41207	34	6
7	1.32530	39	1.34829	38	1.37042	36	1.39176	35	1.41241	34	7
8	1.32569	39	1.34867	37	1.37078	37	1.39211	35	1.41275	34	8
9	1.32608	39	1.34904	38	1.37115	36	1.39246	35	1.41309	34	9
10	1.32647	39	1.34942	37	1.37151	36	1.39281	35	1.41343	34	10
		39		37		36		35		34	
11	1.32686	39	1.34979	38	1.37187	36	1.39316	35	1.41377	33	11
12	1.32725	39	1.35017	37	1.37223	36	1.39351	35	1.41410	34	12
13	1.32764	39	1.35054	38	1.37259	36	1.39386	35	1.41444	34	13
14	1.32803	39	1.35092	37	1.37295	36	1.39421	35	1.41478	34	14
15	1.32841	38	1.35129	37	1.37331	36	1.39455	34	1.41512	34	15
		39		37		36		35		34	
16	1.32880	39	1.35166	38	1.37367	36	1.39490	35	1.41546	33	16
17	1.32919	39	1.35204	37	1.37403	36	1.39525	35	1.41579	34	17
18	1.32958	39	1.35241	38	1.37439	36	1.39560	35	1.41613	34	18
19	1.32997	39	1.35279	37	1.37475	36	1.39595	35	1.41647	34	19
20	1.33036	39	1.35316	37	1.37511	36	1.39630	35	1.41681	34	20
		39		37		36		35		33	
21	1.33075	38	1.35353	37	1.37547	36	1.39665	34	1.41714	34	21
22	1.33113	39	1.35390	38	1.37583	37	1.39699	35	1.41748	33	22
23	1.33152	39	1.35428	37	1.37618	36	1.39734	34	1.41781	34	23
24	1.33191	39	1.35465	37	1.37654	36	1.39768	35	1.41815	33	24
25	1.33230	39	1.35502	37	1.37690	36	1.39803	35	1.41848	33	25
		38		38		36		33		33	
26	1.33268	39	1.35540	37	1.37726	35	1.39838	34	1.41881	34	26
27	1.33307	39	1.35577	37	1.37761	36	1.39872	35	1.41915	33	27
28	1.33346	38	1.35614	37	1.37797	36	1.39907	34	1.41948	34	28
29	1.33384	39	1.35651	37	1.37833	36	1.39941	35	1.41982	33	29
30	1.33423	39	1.35688	37	1.37869	36	1.39976	35	1.42015	33	30
		38		37		36		35		33	
31	1.33461	39	1.35725	37	1.37905	36	1.40011	34	1.42048	34	31
32	1.33500	38	1.35762	37	1.37941	35	1.40045	35	1.42082	33	32
33	1.33538	38	1.35799	37	1.37976	36	1.40080	34	1.42115	34	33
34	1.33576	39	1.35835	36	1.38012	36	1.40114	35	1.42149	33	34
35	1.33615	38	1.35872	37	1.38048	35	1.40149	35	1.42182	33	35
		38		37		36		34		33	
36	1.33653	38	1.35909	37	1.38083	36	1.40183	35	1.42215	34	36
37	1.33691	39	1.35946	36	1.38119	35	1.40218	34	1.42249	33	37
38	1.33730	38	1.35982	37	1.38154	36	1.40252	35	1.42282	34	38
39	1.33768	38	1.36019	37	1.38190	36	1.40287	34	1.42316	33	39
40	1.33806	38	1.36056	37	1.38226	35	1.40321	34	1.42349	33	40
		38		37		36		34		33	
41	1.33844	38	1.36093	36	1.38261	36	1.40355	34	1.42382	34	41
42	1.33882	38	1.36129	37	1.38297	35	1.40389	35	1.42416	33	42
43	1.33920	38	1.36166	37	1.38332	36	1.40424	34	1.42449	33	43
44	1.33959	39	1.36203	37	1.38368	35	1.40458	34	1.42482	33	44
45	1.33997	38	1.36240	37	1.38403	35	1.40492	34	1.42516	34	45
		38		36		35		34		33	
46	1.34035	38	1.36276	37	1.38438	36	1.40526	35	1.42549	33	46
47	1.34073	38	1.36313	37	1.38474	35	1.40561	34	1.42582	33	47
48	1.34111	38	1.36350	36	1.38509	36	1.40595	34	1.42616	34	48
49	1.34149	38	1.36386	37	1.38545	35	1.40629	34	1.42649	33	49
50	1.34187	38	1.36423	37	1.38580	35	1.40663	34	1.42682	33	50
		38		37		35		34		33	
51	1.34225	38	1.36460	36	1.38615	35	1.40697	34	1.42715	33	51
52	1.34263	38	1.36496	37	1.38650	36	1.40731	34	1.42748	33	52
53	1.34301	38	1.36533	36	1.38686	35	1.40765	34	1.42781	33	53
54	1.34339	38	1.36569	37	1.38721	35	1.40800	35	1.42814	33	54
55	1.34376	37	1.36606	37	1.38756	35	1.40834	34	1.42847	33	55
		38		36		35		34		33	
56	1.34414	38	1.36642	37	1.38791	36	1.40868	34	1.42880	33	56
57	1.34452	38	1.36679	36	1.38827	35	1.40902	34	1.42913	33	57
58	1.34490	38	1.36715	37	1.38862	35	1.40936	34	1.42946	33	58
59	1.34528	38	1.36752	36	1.38897	35	1.40970	34	1.42979	33	59
60	1.34566	38	1.36788	36	1.38932	35	1.41004	34	1.43012	33	60

′	25°		26°		27°		28°		29°		′
0	1.43012	33	1.44962	32	1.46859	31	1.48709	30	1.50515	30	0
1	1.43045	33	1.44994	32	1.46890	31	1.48739	31	1.50545	29	1
2	1.43078	33	1.45026	32	1.46921	32	1.48770	30	1.50574	30	2
3	1.43111	33	1.45058	32	1.46953	31	1.48800	31	1.50604	30	3
4	1.43144	33	1.45090	32	1.46984	31	1.48831	30	1.50634	30	4
5	1.43177	33	1.45122	32	1.47015	31	1.48861	30	1.50664	29	5
6	1.43210	33	1.45154	32	1.47046	32	1.48891	31	1.50693	30	6
7	1.43243	32	1.45186	32	1.47078	31	1.48922	30	1.50723	30	7
8	1.43275	33	1.45218	32	1.47109	31	1.48952	31	1.50753	30	8
9	1.43308	33	1.45250	32	1.47140	31	1.48983	30	1.50783	30	9
10	1.43341	33	1.45282	32	1.47171	31	1.49013	30	1.50813	30	10
11	1.43374	33	1.45314	32	1.47202	31	1.49043	31	1.50843	29	11
12	1.43407	33	1.45346	31	1.47233	31	1.49074	30	1.50872	30	12
13	1.43439	32	1.45377	32	1.47264	31	1.49104	30	1.50902	29	13
14	1.43472	33	1.45409	32	1.47295	31	1.49134	31	1.50931	30	14
15	1.43505	33	1.45441	32	1.47326	31	1.49165	30	1.50961	30	15
16	1.43538	32	1.45473	32	1.47357	31	1.49195	30	1.50991	29	16
17	1.43570	33	1.45505	31	1.47388	31	1.49225	31	1.51020	30	17
18	1.43603	32	1.45536	32	1.47419	31	1.49256	30	1.51050	29	18
19	1.43635	33	1.45568	32	1.47450	31	1.49286	30	1.51079	30	19
20	1.43668	33	1.45600	32	1.47481	31	1.49316	30	1.51109	29	20
21	1.43701	32	1.45632	32	1.47512	31	1.49346	30	1.51138	30	21
22	1.43733	33	1.45664	31	1.47543	31	1.49376	30	1.51168	29	22
23	1.43766	33	1.45695	32	1.47574	31	1.49406	31	1.51197	30	23
24	1.43798	32	1.45727	32	1.47605	31	1.49437	30	1.51227	29	24
25	1.43831	33	1.45759	32	1.47636	30	1.49467	30	1.51256	30	25
26	1.43864	32	1.45791	31	1.47666	31	1.49497	30	1.51286	29	26
27	1.43896	33	1.45822	32	1.47697	31	1.49527	30	1.51315	30	27
28	1.43929	32	1.45854	32	1.47728	31	1.49557	30	1.51345	29	28
29	1.43961	33	1.45886	31	1.47759	31	1.49587	30	1.51374	30	29
30	1.43994	32	1.45917	32	1.47790	31	1.49617	30	1.51404	29	30
31	1.44026	33	1.45949	31	1.47821	30	1.49647	30	1.51433	30	31
32	1.44059	32	1.45980	32	1.47851	31	1.49677	30	1.51463	29	32
33	1.44091	33	1.46012	31	1.47882	31	1.49707	30	1.51492	30	33
34	1.44124	32	1.46043	32	1.47913	31	1.49738	31	1.51522	29	34
35	1.44156	32	1.46075	32	1.47944	30	1.49768	30	1.51551	29	35
36	1.44188	33	1.46107	31	1.47974	31	1.49798	30	1.51580	30	36
37	1.44221	32	1.46138	32	1.48005	31	1.49828	30	1.51610	29	37
38	1.44253	33	1.46170	31	1.48036	31	1.49858	30	1.51639	30	38
39	1.44286	32	1.46201	32	1.48067	30	1.49888	30	1.51669	29	39
40	1.44318	32	1.46233	31	1.48097	31	1.49918	30	1.51698	29	40
41	1.44350	33	1.46264	32	1.48128	31	1.49948	30	1.51727	30	41
42	1.44383	32	1.46296	31	1.48159	30	1.49978	30	1.51757	29	42
43	1.44415	33	1.46327	32	1.48189	31	1.50008	30	1.51786	29	43
44	1.44448	32	1.46359	31	1.48220	31	1.50038	29	1.51815	29	44
45	1.44480	32	1.46390	31	1.48251	31	1.50067	30	1.51844	30	45
46	1.44512	32	1.46421	32	1.48282	30	1.50097	30	1.51874	29	46
47	1.44544	33	1.46453	31	1.48312	31	1.50127	30	1.51903	29	47
48	1.44577	32	1.46484	32	1.48343	31	1.50157	30	1.51932	30	48
49	1.44609	32	1.46516	31	1.48374	30	1.50187	30	1.51962	29	49
50	1.44641	32	1.46547	31	1.48404	31	1.50217	30	1.51991	29	50
51	1.44673	32	1.46578	31	1.48435	30	1.50247	29	1.52020	29	51
52	1.44705	32	1.46609	32	1.48465	31	1.50276	30	1.52049	30	52
53	1.44738	33	1.46641	31	1.48496	30	1.50306	30	1.52079	29	53
54	1.44770	32	1.46672	31	1.48526	31	1.50336	30	1.52108	29	54
55	1.44802	32	1.46703	31	1.48557	30	1.50366	30	1.52137	29	55
56	1.44834	32	1.46734	32	1.48587	31	1.50396	29	1.52166	29	56
57	1.44866	32	1.46766	31	1.48618	30	1.50425	30	1.52195	30	57
58	1.44898	32	1.46797	31	1.48648	31	1.50455	30	1.52225	29	58
59	1.44930	32	1.46828	31	1.48679	30	1.50485	30	1.52254	29	59
60	1.44962		1.46859		1.48709		1.50515		1.52283		60

′	30°		31°		32°		33°		34°		′
0	1.52283	29	1.54015	29	1.55715	28	1.57386	28	1.59031	27	0
1	1.52312	29	1.54044	28	1.55743	28	1.57414	27	1.59058	27	1
2	1.52341	29	1 54072	29	1.55771	28	1.57441	28	1.59085	28	2
3	1.52370	29	1.54101	28	1.55799	28	1.57469	27	1.59113	27	3
4	1.52399	30	1.54129	29	1.55827	28	1.57496	28	1.59140	27	4
5	1 52429	29	1.54158	29	1.55855	28	1.57524	28	1.59167	27	5
6	1.52458	29	1.54187	29	1.55883	28	1.57352	27	1.59194	28	6
7	1.52487	29	1.54215	28	1.55911	28	1.57579	28	1.59222	27	7
8	1.52516	29	1.54244	29	1.55939	28	1.57607	27	1.59249	27	8
9	1.52545	29	1·54272	28	1.55967	28	1.57634	28	1.59276	27	9
10	1.52574	29	1.54301	29	1.55995	28	1.57662	28	1.59303	27	10
11	1.52603	29	1.54329	28	1.56023	28	1.57689	27	1.59330	27	11
12	1.52632	29	1.54358	29	1.56051	28	1.57717	28	1.59357	27	12
13	1.52661	29	1.54386	28	1.56079	28	1.57744	27	1.59384	28	13
14	1.52690	29	1.54415	29	1.56107	28	1.57772	27	1.59412	27	14
15	1.52719	29	1.54443	28	1 56135	28	1.57799	28	1.59439	27	15
16	1.52748	29	1.54471	28	1.56163	28	1.57827	27	1.59466	27	16
17	1.52777	29	1.54500	29	1 56191	28	1.57854	28	1.59493	27	17
18	1.52806	29	1.54528	28	1.56219	28	1.57882	27	1.59520	27	18
19	1.52835	29	1.54557	29	1.56247	28	1.57909	28	1 59547	27	19
20	1.52864	29	1 54585	28	1.56275	28	1.57937	27	1.59574	27	20
21	1.52893	29	1.54614	29	1.56303	28	1.57964	28	1.59601	27	21
22	1.52922	29	1.54642	28	1.56331	28	1.57992	27	1.59628	27	22
23	1.52951	29	1.54671	29	1.56359	28	1.58019	28	1.59655	27	23
24	1.52980	29	1.54699	28	1.56387	27	1.58047	27	1.59682	27	24
25	1.53008	28	1.54727	28	1.56414	28	1.58074	27	1.59709	27	25
26	1 53037	29	1.54756	29	1.56442	28	1.58101	28	1.59736	27	26
27	1.53066	29	1.54784	28	1.56470	28	1.58129	27	1.59763	27	27
28	1.53095	29	1.54812	28	1.56498	28	1.58156	28	1.59790	27	28
29	1.53124	29	1.54841	29	1.56526	28	1.58184	27	1.59817	27	29
30	1.53153	29	1.54869	28	1.56554	28	1.58211	27	1.59844	27	30
31	1.53182	29	1.54897	28	1.56582	28	1.58238	28	1.59871	27	31
32	1.53211	29	1.54925	28	1.56610	27	1.58266	27	1.59898	27	32
33	1.53240	29	1.54954	29	1 56637	28	1.58293	28	1.59925	27	33
34	1.53268	28	1.54982	28	1.56665	28	1.58321	27	1.59952	27	34
35	1.53297	29	1.55010	28	1.56693	28	1.58348	27	1.59979	27	35
36	1.53326	29	1.55039	29	1.56721	27	1.58375	28	1.60006	27	36
37	1.53355	29	1.55067	28	1 56748	28	1.58403	27	1.60033	27	37
38	1.53384	29	1.55095	28	1.56776	28	1.58430	28	1.60060	27	38
39	1.53413	29	1.55124	29	1.56804	28	1.58458	27	1 60087	27	39
40	1 53442	29	1.55152	28	1.56832	28	1 58485	27	1.60114	27	40
41	1.53471	29	1.55180	28	1.56860	27	1.58512	28	1.60141	27	41
42	1.53499	28	1.55208	29	1 56887	28	1.58540	27	1.60168	27	42
43	1.53528	29	1.55237	28	1.56915	28	1.58567	27	1.60195	27	43
44	1.53557	29	1.55265	28	1.56943	28	1.58594	28	1.60222	27	44
45	1.53585	28	1.55293	28	1.56971	28	1.58622	27	1 60249	27	45
46	1.53614	29	1.55321	28	1.56998	27	1.58649	27	1.60276	27	46
47	1.53643	29	1.55350	29	1.57026	28	1.58676	28	1.60303	27	47
48	1.53672	29	1.55378	28	1.57054	28	1.58704	27	1.60330	27	48
49	1.53700	28	1.55406	28	1.57081	27	1.58731	27	1.60357	27	4
50	1.53729	29	1.55434	28	1.57109	28	1.58758	27	1.60384	27	50
51	1.53758	29	1.55462	28	1.57137	28	1.58785	28	1.60411	27	51
52	1.53786	28	1.55490	28	1.57165	27	1.58813	27	1.60438	27	52
53	1.53815	29	1.55518	28	1.57192	28	1.58840	27	1.60465	27	53
54	1 53843	28	1.55546	29	1.57220	28	1.58867	28	1.60492	27	54
55	1.53872	29	1.55575	28	1.57248	27	1.58895	27	1.60519	26	55
56	1.53901	28	1.55603	28	1.57275	28	1.58922	27	1.60545	27	56
57	1.53929	29	1.55631	28	1.57303	28	1.58949	28	1.60572	27	57
58	1.53958	28	1.55659	28	1.57331	27	1.58977	27	1.60599	27	58
59	1.53986	29	1.55687	28	1.57358	28	1.59004	27	1.60626	27	59
60	1.54015		1.55715		1.57386		1.59031		1.60653		60

′	35°		36°		37°		38°		39°		′
0	1.60653	27	1.62254	27	1.63837	26	1.65405	26	1.66959	26	0
1	1.60680	27	1.62281	26	1.63863	27	1.65431	26	1.66985	26	1
2	1.60707	27	1.62307	27	1.63890	26	1.65457	26	1.67011	25	2
3	1.60734	26	1.62334	26	1.63916	26	1.65483	26	1.67036	26	3
4	1.60760	27	1.62360	27	1.63942	27	1.65509	26	1.67062	26	4
5	1.60787	27	1.62387	26	1.63969	26	1.65535	26	1.67088	26	5
6	1.60814	27	1.62413	27	1.63995	26	1.65561	26	1.67114	25	6
7	1.60841	26	1.62440	26	1.64021	26	1.65587	26	1.67139	26	7
8	1.60867	27	1.62466	27	1.64047	27	1.65613	26	1.67165	26	8
9	1.60894	27	1.62493	26	1.64074	26	1.65639	26	1.67191	26	9
10	1.60921	27	1.62519	27	1.64100	26	1.65665	26	1.67217	26	10
11	1.60948	27	1.62546	26	1.64126	26	1.65691	26	1.67243	25	11
12	1.60975	26	1.62572	27	1.64152	27	1.65717	26	1.67268	26	12
13	1.61001	27	1.62599	26	1.64179	26	1.65743	26	1.67294	26	13
14	1.61028	27	1.62625	27	1.64205	26	1.65769	26	1.67320	26	14
15	1.61055	27	1.62652	26	1.64231	26	1.65794	25	1.67346	25	15
16	1.61082	27	1.62678	27	1.64257	27	1.65820	26	1.67371	26	16
17	1.61108	26	1.62705	26	1.64284	26	1.65846	26	1.67397	26	17
18	1.61135	27	1.62731	27	1.64310	26	1.65872	26	1.67423	25	18
19	1.61162	27	1.62758	26	1.64336	26	1.65898	26	1.67448	26	19
20	1.61189	27	1.62784	26	1.64362	26	1.65924	26	1.67474	26	20
21	1.61216	27	1.62810	27	1.64388	26	1.65950	26	1.67500	26	21
22	1.61242	26	1.62837	26	1.64414	26	1.65976	26	1.67526	25	22
23	1.61269	27	1.62863	27	1.64440	27	1.66002	26	1.67551	26	23
24	1.61296	27	1.62890	26	1.64467	26	1.66028	25	1.67577	26	24
25	1.61323	26	1.62916	26	1.64493	26	1.66053	26	1.67603	25	25
26	1.61349	27	1.62942	27	1.64519	26	1.66079	26	1.67628	26	26
27	1.61376	27	1.62969	26	1.64545	26	1.66105	26	1.67654	26	27
28	1.61403	26	1.62995	27	1.64571	26	1.66131	26	1.67680	25	28
29	1.61429	27	1.63022	26	1.64597	26	1.66157	26	1.67705	26	29
30	1.61456	27	1.63048	26	1.64623	26	1.66183	26	1.67731	26	30
31	1.61483	26	1.63074	27	1.64649	26	1.66209	26	1.67757	25	31
32	1.61509	27	1.63101	26	1.64675	26	1.66235	26	1.67782	26	32
33	1.61536	26	1.63127	27	1.64701	27	1.66261	26	1.67808	26	33
34	1.61562	27	1.63154	26	1.64728	26	1.66287	25	1.67834	25	34
35	1.61589	27	1.63180	26	1.64754	26	1.66312	26	1.67859	26	35
36	1.61616	26	1.63206	27	1.64780	26	1.66338	26	1.67885	26	36
37	1.61642	27	1.63233	26	1.64806	26	1.66364	26	1.67911	26	37
38	1.61669	26	1.63259	27	1.64832	26	1.66390	26	1.67937	25	38
39	1.61695	27	1.63286	26	1.64858	26	1.66416	26	1.67962	26	39
40	1.61722	27	1.63312	26	1.64884	26	1.66442	26	1.67988	26	40
41	1.61749	26	1.63338	27	1.64910	26	1.66468	26	1.68014	25	41
42	1.61775	27	1.63365	26	1.64936	26	1.66494	26	1.68039	26	42
43	1.61802	26	1.63391	26	1.64962	26	1.66520	26	1.68065	25	43
44	1.61828	27	1.63417	26	1.64988	27	1.66546	25	1.68090	26	44
45	1.61855	27	1.63443	27	1.65015	26	1.66571	26	1.68116	26	45
46	1.61882	26	1.63470	26	1.65041	26	1.66597	26	1.68142	25	46
47	1.61908	27	1.63496	26	1.65067	26	1.66623	26	1.68167	26	47
48	1.61935	26	1.63522	27	1.65093	26	1.66649	26	1.68193	25	48
49	1.61961	27	1.63549	26	1.65119	26	1.66675	26	1.68218	26	49
50	1.61988	27	1.63575	26	1.65145	26	1.66701	26	1.68244	26	50
51	1.62015	26	1.63601	26	1.65171	26	1.66727	26	1.68270	25	51
52	1.62041	27	1.63627	27	1.65197	26	1.66753	25	1.68295	26	52
53	1.62068	26	1.63654	26	1.65223	26	1.66778	26	1.68321	25	53
54	1.62094	27	1.63680	26	1.95249	26	1.66804	26	1.68346	26	54
55	1.62121	27	1.63706	26	1.65275	26	1.66830	26	1.68372	26	55
56	1.62148	26	1.63732	26	1.65301	26	1.66856	26	1.68398	25	56
57	1.62174	27	1.63758	27	1.65327	26	1.66882	25	1.68423	26	57
58	1.62201	26	1.63785	26	1.65353	26	1.66907	26	1.68449	25	58
59	1.62227	27	1.63811	26	1.65379	26	1.66933	26	1.68474	26	59
60	1.62254		1.63837		1.65405		1.66959		1.68500		60

′	40°		41°		42°		43°		44°		′
0	1.68500	26	1.70093	25	1.71558	25	1.73077	25	1.74591	25	0
1	1.68526	25	1.70058	26	1.71583	26	1.73102	25	1.74616	25	1
2	1.68551	26	1.70084	25	1.71609	25	1.73127	26	1.74641	25	2
3	1.68577	25	1.70109	26	1.71634	25	1.73153	25	1.74666	26	3
4	1.68602	26	1.70135	25	1.71659	26	1.73178	25	1.74692	25	4
5	1.68628	26	1.70160	26	1.71685	25	1.73203	25	1.74717	25	5
6	1.68654	25	1.70186	25	1.71710	25	1.73228	25	1.74742	25	6
7	1.68679	26	1.70211	26	1.71735	26	1.73254	26	1.74767	25	7
8	1.68705	25	1.70237	25	1.71761	25	1.73279	25	1.74793	26	8
9	1.68730	26	1.70262	26	1.71786	25	1.73304	25	1.74818	25	9
10	1.68756	26	1.70288	25	1.71811	25	1.73329	25	1.74843	25	10
11	1.68782	25	1.70313	26	1.71836	26	1.73354	26	1.74868	25	11
12	1.68807	26	1.70339	25	1.71862	25	1.73380	25	1.74893	26	12
13	1.68833	25	1.70364	26	1.71887	25	1.73405	25	1.74919	25	13
14	1.68858	26	1.70390	25	1.71913	25	1.73430	26	1.74944	25	14
15	1.68884	26	1.70415	25	1.71938	25	1.73456	25	1.74969	25	15
16	1.68910	25	1.70440	26	1.71963	26	1.73481	25	1.74994	26	16
17	1.68935	26	1.70466	25	1.71989	25	1.73506	26	1.75020	25	17
18	1.68961	25	1.70491	26	1.72014	26	1.73532	25	1.75045	25	18
19	1.68986	26	1.70517	25	1.72040	25	1.73557	25	1.75070	25	19
20	1.69012	26	1.70542	25	1.72065	25	1.73582	25	1.75095	25	20
21	1.69038	25	1.70567	26	1.72090	26	1.73607	25	1.75120	25	21
22	1.69063	26	1.70593	25	1.72116	25	1.73632	26	1.75145	26	22
23	1.69089	26	1.70618	25	1.72141	25	1.73658	25	1.75171	25	23
24	1.69114	25	1.70644	26	1.72166	26	1.73683	25	1.75196	25	24
25	1.69140	26	1.70669	25	1.72192	25	1.73708	25	1.75221	25	25
26	1.69166	25	1.70694	26	1.72217	25	1.73733	25	1.75246	25	26
27	1.69191	26	1.70720	25	1.72242	26	1.73758	26	1.75272	26	27
28	1.69217	25	1.70745	26	1.72268	25	1.73784	25	1.75297	25	28
29	1.69242	26	1.70771	25	1.72293	25	1.73809	25	1.75322	25	29
30	1.69268	25	1.70796	25	1.72318	25	1.73834	25	1.75347	25	30
31	1.69293	26	1.70821	25	1.72343	26	1.73859	25	1.75372	25	31
32	1.69319	25	1.70847	26	1.72369	25	1.73884	26	1.75398	26	32
33	1.69344	26	1.70872	25	1.72394	25	1.73910	25	1.75423	25	33
34	1.69370	25	1.70898	26	1.72419	26	1.73935	25	1.75448	25	34
35	1.69395	26	1.70923	25	1.72445	25	1.73960	25	1.75474	26	35
36	1.69421	25	1.70948	26	1.72470	25	1.73985	25	1.75499	25	36
37	1.69446	26	1.70974	25	1.72495	26	1.74010	26	1.75524	25	37
38	1.69472	26	1.70999	25	1.72521	25	1.74036	25	1.75550	26	38
39	1.69497	25	1.71025	26	1.72546	25	1.74061	25	1.75575	25	39
40	1.69523	26	1.71050	25	1.72571	25	1.74086	25	1.75600	25	40
41	1.69548	26	1.71075	26	1.72596	26	1.74111	25	1.75625	25	41
42	1.69574	25	1.71101	25	1.72622	25	1.74136	26	1.75650	25	42
43	1.69599	26	1.71126	26	1.72647	25	1.74162	25	1.75676	26	43
44	1.69625	25	1.71152	25	1.72672	26	1.74187	25	1.75701	25	44
45	1.69650	26	1.71177	25	1.72698	25	1.74212	25	1.75726	25	45
46	1.69676	25	1.71202	26	1.72723	25	1.74237	25	1.75752	26	46
47	1.69701	26	1.71228	25	1.72748	26	1.74262	26	1.75777	25	47
48	1.69727	26	1.71253	25	1.72774	25	1.74288	25	1.75802	25	48
49	1.69752	25	1.71279	26	1.72799	25	1.74313	25	1.75827	25	49
50	1.69778	26	1.71304	25	1.72824	25	1.74338	25	1.75852	25	50
51	1.69803	25	1.71329	25	1.72849	25	1.74363	25	1.75877	25	51
52	1.69829	26	1.71355	26	1.72875	26	1.74389	26	1.75903	26	52
53	1.69854	25	1.71380	25	1.72900	25	1.74414	25	1.75928	25	53
54	1.69880	26	1.71406	26	1.72925	25	1.74439	25	1.75953	25	54
55	1.69905	25	1.71431	25	1.72951	26	1.74465	26	1.75978	25	55
56	1.69931	26	1.71456	26	1.72976	25	1.74490	25	1.76003	25	56
57	1.69956	25	1.71482	25	1.73001	25	1.74515	25	1.76029	26	57
58	1.69982	26	1.71507	26	1.73027	26	1.74541	26	1.76054	25	58
59	1.70007	25	1.71533	25	1.73052	25	1.74566	25	1.76079	25	59
60	1.70033	26	1.71558	25	1.73077	25	1.74591	25	1.76104	25	60

′	45°		46°		47°		48°		49°		′
0	1.76104	25	1.77616	25	1.79130	25	1.80648	25	1.82171	25	0
1	1.76129	25	1.77641	25	1.79155	26	1.80673	26	1.82196	26	1
2	1.76154	26	1.77666	26	1.79181	25	1.80699	25	1.82222	26	2
3	1.76180	25	1.77692	25	1.79206	25	1.80724	26	1.82247	26	3
4	1.76205	25	1.77717	25	1.79231	26	1.80750	25	1.82273	25	4
5	1.76230	25	1.77742	25	1.79257	25	1.80775	25	1.82298	25	5
6	1.76255	26	1.77767	25	1.79282	25	1.80800	26	1.82323	26	6
7	1.76281	25	1.77793	26	1.79307	26	1.80826	25	1.82349	25	7
8	1.76306	25	1.77818	25	1.79333	25	1.80851	26	1.82374	26	8
9	1.76331	25	1.77843	25	1.79358	25	1.80877	25	1.82400	25	9
10	1.76356	25	1.77868	25	1.79383	26	1.80902	25	1.82425	26	10
11	1.76381	25	1.77893	25	1.79409	25	1.80927	26	1.82451	25	11
12	1.76406	26	1.77918	26	1.79434	25	1.80953	25	1.82476	26	12
13	1.76432	25	1.77944	25	1.79459	25	1.80978	26	1.82502	25	13
14	1.76457	25	1.77969	25	1.79484	26	1.81004	25	1.82527	26	14
15	1.76482	25	1.77994	25	1.79510	25	1.81029	25	1.82553	25	15
16	1.76507	26	1.78019	26	1.79535	25	1.81054	26	1.82578	26	16
17	1.76533	25	1.78045	25	1.79560	26	1.81080	25	1.82604	25	17
18	1.76558	25	1.78070	25	1.79586	25	1.81105	25	1.82629	26	18
19	1.76583	25	1.78095	26	1.79611	25	1.81130	25	1.82655	25	19
20	1.76608	25	1.78121	25	1.79636	25	1.81155	26	1.82680	26	20
21	1.76633	25	1.78146	25	1.79661	26	1.81181	25	1.82706	25	21
22	1.76658	26	1.78171	26	1.79687	25	1.81206	26	1.82731	26	22
23	1.76684	25	1.78197	25	1.79712	25	1.81232	25	1.82757	25	23
24	1.76709	25	1.78222	25	1.79737	25	1.81257	25	1.82782	26	24
25	1.76734	25	1.78247	25	1.79762	26	1.81282	26	1.82808	25	25
26	1.76759	26	1.78272	26	1.79788	25	1.81308	25	1.82833	26	26
27	1.76785	25	1.78298	25	1.79813	25	1.81333	25	1.82859	25	27
28	1.76810	25	1.78323	25	1.79838	26	1.81358	26	1.82884	26	28
29	1.76835	25	1.78348	25	1.79864	25	1.81384	25	1.82910	25	29
30	1.76860	25	1.78373	25	1.79889	25	1.81409	25	1.82935	26	30
31	1.76885	25	1.78398	25	1.79914	26	1.81434	26	1.82961	25	31
32	1.76910	26	1.78423	25	1.79940	25	1.81460	25	1.82986	26	32
33	1.76936	25	1.78449	26	1.79965	25	1.81485	25	1.83012	25	33
34	1.76961	25	1.78474	25	1.79990	26	1.81510	26	1.83037	26	34
35	1.76986	25	1.78499	25	1.80016	25	1.81536	25	1.83063	25	35
36	1.77011	26	1.78524	26	1.80041	25	1.81561	25	1.83088	26	36
37	1.77037	25	1.78550	25	1.80066	25	1.81586	26	1.83114	25	37
38	1.77062	25	1.78575	25	1.80091	26	1.81612	25	1.83139	26	38
39	1.77087	25	1.78600	25	1.80117	25	1.81637	26	1.83165	25	39
40	1.77112	25	1.78625	26	1.80142	25	1.81663	25	1.83190	26	40
41	1.77137	25	1.78651	25	1.80167	26	1.81688	26	1.83216	25	41
42	1.77162	26	1.78676	25	1.80193	25	1.81714	25	1.83241	26	42
43	1.77188	25	1.78701	25	1.80218	25	1.81739	26	1.83267	25	43
44	1.77213	25	1.78726	26	1.80243	26	1.81765	25	1.83292	26	44
45	1.77238	25	1.78752	25	1.80269	25	1.81790	25	1.83318	25	45
46	1.77263	26	1.78777	25	1.80294	25	1.81815	26	1.83343	26	46
47	1.77289	25	1.78802	25	1.80319	26	1.81841	25	1.83369	25	47
48	1.77314	25	1.78827	26	1.80345	25	1.81866	26	1.83394	26	48
49	1.77339	25	1.78853	25	1.80370	25	1.81892	25	1.83420	25	49
50	1.77364	25	1.78878	25	1.80395	26	1.81917	26	1.83445	26	50
51	1.77389	25	1.78903	25	1.80421	25	1.81943	25	1.83471	25	51
52	1.77414	26	1.78928	26	1.80446	25	1.81968	26	1.83496	26	52
53	1.77440	25	1.78954	25	1.80471	26	1.81994	25	1.83522	26	53
54	1.77465	25	1.78979	25	1.80497	25	1.82019	25	1.83548	25	54
55	1.77490	25	1.79004	25	1.80522	25	1.82044	26	1.83573	26	55
56	1.77515	26	1.79029	26	1.80547	25	1.82070	25	1.83599	25	56
57	1.77541	25	1.79055	25	1.80572	26	1.82095	26	1.83624	26	57
58	1.77566	25	1.79080	25	1.80598	25	1.82121	25	1.83650	25	58
59	1.77591	25	1.79105	25	1.80623	25	1.82146	25	1.83675	26	59
60	1.77616		1.79130		1.80648		1.82171		1.83701		60

′	50°		51°		52°		53°		54°		′
0	1.83701	26	1.85240	26	1.86790	26	1.88354	26	1.89932	26	0
1	1.83727	25	1.85266	26	1.86816	26	1.88380	26	1.89958	27	1
2	1.83752	26	1.85292	25	1.86842	26	1.88406	27	1.89985	26	2
3	1.83778	25	1.85317	26	1.86868	26	1.88433	26	1.90011	27	3
4	1.83803	26	1.85343	26	1.86894	26	1.88459	26	1.90038	26	4
5	1.83829	26	1.85369	26	1.86920	26	1.88485	26	1.90064	26	5
6	1.83855	25	1.85395	25	1.86946	26	1.88511	26	1.90090	27	6
7	1.83880	26	1.85420	26	1.86972	26	1.88537	27	1.90117	26	7
8	1.83906	25	1.85446	26	1.86998	26	1.88564	26	1.90143	27	8
9	1.83931	26	1.85472	26	1.87024	26	1.88590	26	1.90170	26	9
10	1.83957	26	1.85498	25	1.87050	26	1.88616	26	1.90196	26	10
11	1.83983	25	1.85523	26	1.87076	26	1.88642	26	1.90222	27	11
12	1.84008	26	1.85549	26	1.87102	26	1.88668	27	1.90249	26	12
13	1.84034	25	1.85575	26	1.87128	26	1.88695	26	1.90275	27	13
14	1.84059	26	1.85601	25	1.87154	26	1.88721	26	1.90302	26	14
15	1.84085	26	1.85626	26	1.87180	26	1.88747	26	1.90328	27	15
16	1.84111	25	1.85652	26	1.87206	26	1.88773	27	1.90355	26	16
17	1.84136	26	1.85678	26	1.87232	26	1.88800	26	1.90381	27	17
18	1.84162	25	1.85704	25	1.87258	26	1.88826	26	1.90408	26	18
19	1.84187	26	1.85729	26	1.87284	26	1.88852	26	1.90434	27	19
20	1.84213	26	1.85755	26	1.87310	26	1.88878	26	1.90461	27	20
21	1.84239	25	1.85781	26	1.87336	26	1.88904	27	1.90488	26	21
22	1.84264	26	1.85807	25	1.87362	26	1.88931	26	1.90514	27	22
23	1.84290	25	1.85832	26	1.87388	26	1.88957	26	1.90541	26	23
24	1.84315	26	1.85858	26	1.87414	26	1.88983	27	1.90567	27	24
25	1.84341	26	1.85884	26	1.87440	26	1.89010	26	1.90594	27	25
26	1.84367	25	1.85910	26	1.87466	26	1.89036	26	1.90621	26	26
27	1.84392	26	1.85936	25	1.87492	26	1.89062	26	1.90647	27	27
28	1.84418	25	1.85961	26	1.87518	26	1.89088	27	1.90674	26	28
29	1.84443	26	1.85987	26	1.87544	26	1.89115	26	1.90700	27	29
30	1.84469	26	1.86013	26	1.87570	26	1.89141	26	1.90727	27	30
31	1.84495	25	1.86039	26	1.87596	26	1.89167	27	1.90754	26	31
32	1.84520	26	1.86065	26	1.87622	26	1.89194	26	1.90780	27	32
33	1.84546	26	1.86091	26	1.87648	26	1.89220	26	1.90807	26	33
34	1.84572	25	1.86117	25	1.87675	27	1.89246	27	1.90833	27	34
35	1.84597	26	1.86142	26	1.87701	26	1.89273	26	1.90860	27	35
36	1.84623	26	1.86168	26	1.87727	26	1.89299	26	1.90887	26	36
37	1.84649	25	1.86194	26	1.87753	26	1.89325	27	1.90913	27	37
38	1.84674	26	1.86220	26	1.87779	26	1.89352	26	1.90940	26	38
39	1.84700	26	1.86246	26	1.87805	26	1.89378	26	1.90966	27	39
40	1.84726	26	1.86272	26	1.87831	26	1.89404	27	1.90993	27	40
41	1.84752	25	1.86298	26	1.87857	26	1.89431	26	1.91020	26	41
42	1.84777	26	1.86324	26	1.87883	26	1.89457	27	1.91046	27	42
43	1.84803	26	1.86350	26	1.87909	26	1.89484	26	1.91073	27	43
44	1.84829	25	1.86376	26	1.87935	27	1.89510	26	1.91100	26	44
45	1.84854	26	1.86401	25	1.87962	26	1.89536	27	1.91126	27	45
46	1.84880	26	1.86427	26	1.87988	26	1.89563	26	1.91153	27	46
47	1.84906	26	1.86453	26	1.88014	26	1.89589	26	1.91180	26	47
48	1.84932	26	1.86479	26	1.88040	26	1.89615	27	1.91206	27	48
49	1.84957	25	1.86505	26	1.88066	26	1.89642	26	1.91233	27	49
50	1.84983	26	1.86531	26	1.88092	26	1.89668	27	1.91260	27	50
51	1.85009	26	1.86557	26	1.88118	26	1.89695	26	1.91287	26	51
52	1.85035	25	1.86583	26	1.88144	27	1.89721	26	1.91313	27	52
53	1.85060	26	1.86609	26	1.88171	26	1.89747	27	1.91340	27	53
54	1.85086	26	1.86635	25	1.88197	26	1.89774	26	1.91367	26	54
55	1.85112	25	1.86660	26	1.88223	26	1.89800	27	1.91393	27	55
56	1.85137	26	1.86686	26	1.88249	26	1.89827	26	1.91420	27	56
57	1.85163	26	1.86712	26	1.88275	27	1.89853	26	1.91447	27	57
58	1.85189	25	1.86738	26	1.88302	26	1.89879	27	1.91474	26	58
59	1.85214	26	1.86764	26	1.88328	26	1.89906	26	1.91500	27	59
60	1.85240		1.86790		1.88354		1.89932		1.91527		60

′	55°		56°		57°		58°		59°		′
0	1.91527	27	1.93143	27	1.94781	28	1.96444	28	1.98135	28	0
1	1.91554	27	1.93170	27	1.94809	27	1.96472	28	1.98163	29	1
2	1.91581	27	1.93197	27	1.94836	28	1.96500	28	1.98192	28	2
3	1.91608	27	1.93224	28	1.94864	27	1.96528	28	1.98220	29	3
4	1.91635	26	1.93252	27	1.94891	28	1.96556	28	1.98249	28	4
5	1.91661	27	1.93279	27	1.94919	28	1.96584	28	1.98277	29	5
6	1.91688	27	1.93306	27	1.94947	27	1.96612	28	1.98306	28	6
7	1.91715	26	1.93333	28	1.94974	28	1.96640	28	1.98334	29	7
8	1.91741	27	1.93361	27	1.95002	27	1.96668	28	1.98363	28	8
9	1.91768	27	1.93388	27	1.95029	28	1.96696	28	1.98391	29	9
10	1.91795	27	1.93415	27	1.95057	28	1.96724	28	1.98420	28	10
11	1.91822	27	1.93442	27	1.95085	27	1.96752	28	1.98448	29	11
12	1.91849	26	1.93469	28	1.95112	28	1.96780	28	1.98477	29	12
13	1.91875	27	1.93497	27	1.95140	27	1.96808	29	1.98506	28	13
14	1.91902	27	1.93524	27	1.95167	28	1.96837	28	1.98534	29	14
15	1.91929	27	1.93551	27	1.95195	28	1.96865	28	1.98563	28	15
16	1.91956	26	1.93578	28	1.95223	27	1.96893	28	1.98591	29	16
17	1.91982	27	1.93606	27	1.95250	28	1.96921	28	1.98620	28	17
18	1.92009	27	1.93633	27	1.95278	27	1.96949	28	1.98648	29	18
19	1.92036	27	1.93660	27	1.95305	28	1.96977	28	1.98677	29	19
20	1.92063	27	1.93687	27	1.95333	28	1.97005	28	1.98706	28	20
21	1.92090	27	1.93714	28	1.95361	27	1.97033	28	1.98734	29	21
22	1.92117	27	1.93742	27	1.95388	28	1.97061	28	1.98763	29	22
23	1.92144	27	1.93769	27	1.95416	27	1.97089	28	1.98792	28	23
24	1.92171	27	1.93796	28	1.95443	28	1.97117	29	1.98820	29	24
25	1.92198	27	1.93824	27	1.95471	28	1.97146	28	1.98849	28	25
26	1.92225	27	1.93851	27	1.95499	27	1.97174	28	1.98877	29	26
27	1.92252	27	1.93878	27	1.95526	28	1.97202	28	1.98906	29	27
28	1.92279	27	1.93905	28	1.95554	27	1.97230	28	1.98935	28	28
29	1.92306	27	1.93933	27	1.95581	28	1.97258	28	1.98963	29	29
30	1.92333	27	1.93960	27	1.95609	28	1.97286	28	1.98992	29	30
31	1.92360	27	1.93987	28	1.95637	27	1.97314	28	1.99021	28	31
32	1.92387	27	1.94015	27	1.95664	28	1.97342	29	1.99049	29	32
33	1.92414	26	1.94042	27	1.95692	28	1.97371	28	1.99078	29	33
34	1.92440	27	1.94069	27	1.95720	27	1.97399	28	1.99107	29	34
35	1.92467	27	1.94096	28	1.95747	28	1.97427	28	1.99136	28	35
36	1.92494	27	1.94124	27	1.95775	28	1.97455	29	1.99164	29	36
37	1.92521	27	1.94151	27	1.95803	27	1.97484	28	1.99193	29	37
38	1.92548	27	1.94178	28	1.95830	28	1.97512	28	1.99222	29	38
39	1.92575	27	1.94206	27	1.95858	28	1.97540	28	1.99251	29	39
40	1.92602	27	1.94233	27	1.95886	28	1.97568	28	1.99280	28	40
41	1.92629	27	1.94260	28	1.95914	28	1.97596	29	1.99308	29	41
42	1.92656	27	1.94288	27	1.95942	28	1.97625	28	1.99337	29	42
43	1.92683	27	1.94315	28	1.95970	27	1.97653	28	1.99366	29	43
44	1.92710	27	1.94343	27	1.95997	28	1.97681	28	1.99395	28	44
45	1.92737	27	1.94370	27	1.96025	28	1.97709	29	1.99423	29	45
46	1.92764	27	1.94397	28	1.96053	28	1.97738	28	1.99452	29	46
47	1.92791	27	1.94425	27	1.96081	28	1.97766	28	1.99481	29	47
48	1.92818	27	1.94452	28	1.96109	28	1.97794	29	1.99510	29	48
49	1.92845	27	1.94480	27	1.96137	28	1.97823	28	1.99539	29	49
50	1.92872	27	1.94507	27	1.96165	28	1.97851	28	1.99568	29	50
51	1.92899	27	1.94534	28	1.96193	28	1.97879	29	1.99597	29	51
52	1.92926	27	1.94562	27	1.96221	28	1.97908	28	1.99626	29	52
53	1.92953	27	1.94589	28	1.96249	27	1.97936	29	1.99655	29	53
54	1.92980	28	1.94617	27	1.96276	28	1.97965	28	1.99684	28	54
55	1.93008	27	1.94644	27	1.96304	28	1.97993	28	1.99712	29	55
56	1.93035	27	1.94671	28	1.96332	28	1.98021	29	1.99741	29	56
57	1.93062	27	1.94699	27	1.96360	28	1.98050	28	1.99770	29	57
58	1.93089	27	1.94726	28	1.96388	28	1.98078	29	1.99799	29	58
59	1.93116	27	1.94754	27	1.96416	28	1.98107	28	1.99828	29	59
60	1.93143		1.94781		1.96444		1.98135		1.99857		60

′	60°		61°		62°		63°		64°		′
0	1.99857	29	2.01613	29	2.03406	30	2.05240	31	2.07121	32	0
1	1.99886	29	2.01642	30	2.03436	30	2.05271	31	2.07153	31	1
2	1.99915	29	2.01672	29	2.03466	31	2.05302	31	2.07184	32	2
3	1.99944	29	2.01701	30	2.03497	30	2.05333	31	2.07216	32	3
4	1.99973	29	2.01731	29	2.03527	30	2.05364	31	2.07248	32	4
5	2.00002	29	2.01760	30	2.03557	30	2.05395	31	2.07280	32	5
6	2.00031	29	2.01790	29	2.03587	31	2.05426	31	2.07312	31	6
7	2.00060	29	2.01819	30	2.03618	30	2.05457	31	2.07343	32	7
8	2.00089	29	2.01849	29	2.03648	30	2.05488	31	2.07375	32	8
9	2.00118	29	2.01878	30	2.03678	30	2.05519	31	2.07407	32	9
10	2.00147	29	2.01908	30	2.03708	31	2.05550	31	2.07439	32	10
11	2.00176	29	2.01938	30	2.03739	30	2.05581	31	2.07471	32	11
12	2.00205	30	2.01968	29	2.03769	31	2.05612	32	2.07503	32	12
13	2.00235	29	2.01997	30	2.03800	30	2.05644	31	2.07535	32	13
14	2.00264	29	2.02027	30	2.03830	30	2.05675	31	2.07567	32	14
15	2.00293	29	2.02057	30	2.03860	31	2.05706	31	2.07599	32	15
16	2.00322	30	2.02087	29	2.03891	30	2.05737	32	2.07631	32	16
17	2.00352	29	2.02116	30	2.03921	30	2.05769	31	2.07663	32	17
18	2.00381	29	2.02146	30	2.03951	31	2.05800	31	2.07695	32	18
19	2.00410	29	2.02176	30	2.03982	30	2.05831	31	2.07727	32	19
20	2.00439	29	2.02206	30	2.04012	31	2.05862	31	2.07759	32	20
21	2.00468	29	2.02236	30	2.04043	30	2.05893	32	2.07791	32	21
22	2.00497	30	2.02266	29	2.04073	31	2.05925	31	2.07823	32	22
23	2.00527	29	2.02295	30	2.04104	30	2.05956	31	2.07855	32	23
24	2.00556	29	2.02325	30	2.04134	31	2.05987	32	2.07887	32	24
25	2.00585	29	2.02355	30	2.04165	30	2.06019	31	2.07919	33	25
26	2.00614	30	2.02385	29	2.04195	31	2.06050	31	2.07952	32	26
27	2.00644	29	2.02414	30	2.04226	30	2.06081	32	2.07984	32	27
28	2.00673	29	2.02444	30	2.04256	31	2.06113	31	2.08016	32	28
29	2.00702	29	2.02474	30	2.04287	30	2.06144	31	2.08048	32	29
30	2.00731	29	2.02504	30	2.04317	31	2.06175	31	2.08080	32	30
31	2.00760	29	2.02534	30	2.04348	31	2.06206	32	2.08112	32	31
32	2.00789	30	2.02564	30	2.04379	30	2.06238	31	2.08144	33	32
33	2.00819	29	2.02594	30	2.04409	31	2.06269	32	2.08177	32	33
34	2.00848	29	2.02624	29	2.04440	30	2.06301	31	2.08209	32	34
35	2.00877	29	2.02653	30	2.04470	31	2.06332	31	2.08241	32	35
36	2.00906	30	2.02683	30	2.04501	31	2.06363	32	2.08273	32	36
37	2.00936	29	2.02713	30	2.04532	31	2.06395	31	2.08305	33	37
38	2.00965	29	2.02743	30	2.04563	30	2.06426	32	2.08338	32	38
39	2.00994	29	2.02773	30	2.04593	31	2.06458	31	2.08370	32	39
40	2.01023	30	2.02803	30	2.04624	31	2.06489	31	2.08402	32	40
41	2.01053	29	2.02833	30	2.04655	31	2.06520	32	2.08434	33	41
42	2.01082	29	2.02863	30	2.04686	30	2.06552	31	2.08467	32	42
43	2.01111	30	2.02893	30	2.04716	31	2.06583	32	2.08499	33	43
44	2.01141	29	2.02923	30	2.04747	31	2.06615	31	2.08532	32	44
45	2.01170	30	2.02954	31	2.04778	31	2.06646	32	2.08564	32	45
46	2.01200	29	2.02984	30	2.04809	30	2.06678	31	2.08596	33	46
47	2.01229	29	2.03014	30	2.04839	31	2.06709	32	2.08629	32	47
48	2.01258	30	2.03044	30	2.04870	31	2.06741	31	2.08661	33	48
49	2.01288	29	2.03074	30	2.04901	31	2.06772	32	2.08694	32	49
50	2.01317	30	2.03104	30	2.04932	31	2.06804	32	2.08726	33	50
51	2.01347	29	2.03134	30	2.04963	31	2.06836	31	2.08759	32	51
52	2.01376	30	2.03164	31	2.04994	30	2.06867	32	2.08791	33	52
53	2.01406	29	2.03195	30	2.05024	31	2.06899	32	2.08824	32	53
54	2.01435	30	2.03225	30	2.05055	31	2.06931	31	2.08856	33	54
55	2.01465	30	2.03255	30	2.05086	31	2.06962	32	2.08889	33	55
56	2.01495	29	2.03285	31	2.05117	31	2.06994	32	2.08922	32	56
57	2.01524	30	2.03316	30	2.05148	30	2.07026	32	2.08954	33	57
58	2.01554	29	2.03346	30	2.05178	31	2.07058	31	2.08987	32	58
59	2.01583	30	2.03376	30	2.05209	31	2.07089	32	2.09019	33	59
60	2.01613		2.03406		2.05240		2.07121		2.09052		60

LIBRARY OF THE UNIVERSITY OF CALIFORNIA

′	65°		66°		67°		68°		69°		′
0	2.09052	33	2.11039	34	2.13086	35	2.15201	36	2.17391	37	0
1	2.09085	32	2.11073	33	2.13121	34	2.15237	36	2.17428	37	1
2	2.09117	33	2.11106	34	2.13155	34	2.15273	36	2.17465	38	2
3	2.09150	33	2.11140	33	2.13190	35	2.15309	35	2.17503	37	3
4	2.09183	32	2.11173	34	2.13224	35	2.15344	36	2.17540	37	4
5	2.09215	33	2.11207	34	2.13259	35	2.15380	36	2.17577	38	5
6	2.09248	33	2.11241	33	2.13294	34	2.15416	36	2.17615	37	6
7	2.09281	32	2.11274	34	2.13328	35	2.15452	36	2.17652	37	7
8	2.09313	33	2.11308	33	2.13363	35	2.15488	36	2.17689	38	8
9	2.09346	33	2.11341	34	2.13398	35	2.15524	36	2.17727	37	9
10	2.09379	33	2.11375	34	2.13433	35	2.15560	36	2.17764	37	10
11	2.09412	33	2.11409	34	2.13468	35	2.15596	36	2.17801	38	11
12	2.09445	33	2.11443	34	2.13503	35	2.15632	37	2.17839	37	12
13	2.09478	32	2.11477	33	2.13538	35	2.15669	36	2.17876	38	13
14	2.09510	33	2.11510	34	2.13573	35	2.15705	36	2.17914	37	14
15	2.09543	33	2.11544	34	2.13608	35	2.15741	36	2.17951	38	15
16	2.09576	33	2.11578	34	2.13643	35	2.15777	36	2.17989	37	16
17	2.29609	33	2.11612	34	2.13678	35	2.15813	37	2.18026	38	17
18	2.09642	33	2.11646	34	2.13713	35	2.15850	36	2.18064	37	18
19	2.09675	33	2.11680	34	2.13748	35	2.15886	36	2.18101	38	19
20	2.09708	33	2.11714	34	2.13783	35	2.15922	36	2.18139	38	20
21	2.09741	33	2.11748	34	2.13818	35	2.15958	37	2.18177	37	21
22	2.09774	33	2.11782	34	2.13853	35	2.15995	36	2.18214	38	22
23	2.09807	33	2.11816	34	2.13888	35	2.16031	37	2.18252	38	23
24	2.09840	33	2.11850	34	2.13923	35	2.16068	37	2.18290	38	24
25	2.09873	33	2.11884	34	2 13959	36	2.16104	36	2.18328	37	25
26	2.09906	33	2.11918	34	2.13994	35	2.16140	37	2.28365	38	26
27	2.09939	33	2.11952	34	2.14029	35	2.16177	36	2.18403	38	27
28	2.09972	33	2.11986	34	2.14064	35	2.16213	37	2.18441	38	28
29	2.10005	33	2.12020	34	2.14099	35	2.16250	36	2.18479	38	29
30	2.10038	33	2.12054	34	2.14134	35	2.16286	37	2.18517	38	30
31	2.10071	33	2.12088	34	2.14169	35	2.16323	36	2.18555	38	31
32	2.10104	33	2.12122	34	2.14205	36	2.16359	37	2.18593	38	32
33	2.10137	33	2.12157	35	2.14210	35	2.16396	36	2.18631	38	33
34	2.10171	34	2.12191	34	2 14276	36	2.16432	37	2.18669	38	34
35	2.10204	33	2.12225	34	2.14311	35	2.16469	37	2.18707	38	35
36	2.10237	33	2.12259	34	2.14346	35	2.16506	36	2.18745	38	36
37	2.10270	33	2.12293	35	2.14382	36	2.16542	37	2.18783	38	37
38	2.10304	34	2.12328	34	2.14417	35	2.16579	36	2.18821	38	38
39	2.10337	33	2.12362	34	2.14453	36	2.16615	37	2 18859	38	39
40	2.10370	33	2.12396	34	2.14488	35	2.16652	37	2.18897	38	40
41	2.10403	33	2.12430	35	2.14523	35	2.16689	37	2.18935	38	41
42	2.10437	34	2.12465	34	2.14559	36	2.16726	36	2.18973	38	42
43	2.10470	33	2.12499	34	2.14594	35	2.16762	36	2.19012	39	43
44	2.10504	34	2.12534	35	2.14630	36	2.16799	37	2.19050	38	44
45	2.10537	33	2.12568	34	2.14665	35	2.16836	37	2.19088	38	45
46	2.10570	33	2.12602	34	2.14701	36	2.16873	37	2.19126	38	46
47	2.10604	34	2.12637	35	2.14736	35	2.16909	36	2.19165	39	47
48	2.10637	33	2.12671	34	2.14772	36	2.16946	37	2.19203	38	48
49	2.10671	34	2.12706	35	2.14807	35	2.16983	37	2.19241	38	49
50	2.10704	33	2.12740	34	2.14843	36	2.17020	37	2.19280	39	50
51	2.10737	33	2.12775	35	2.14879	36	2.17057	37	2.19318	38	51
52	2.10771	34	2.12809	34	2.14914	35	2.17094	37	2.19357	39	52
53	2.10804	33	2.12844	35	2.14950	36	2.17131	37	2.19395	38	53
54	2.10838	34	2.12878	34	2.14986	36	2.17168	37	2.19434	39	54
55	2.10871	33	2.12913	35	2.15021	35	2.17205	37	2.19472	38	55
56	2.10905	34	2.12947	34	2.15057	36	2.17242	37	2.19511	39	56
57	2.10938	33	2.12982	35	2.15093	36	2.17280	38	2.19549	38	57
58	2.10972	34	2.13017	35	2.15129	36	2.17317	37	2.19588	39	58
59	2.11005	33	2.13051	34	2.15165	36	2.17354	37	2.19626	38	59
60	2.11039	34	2.13086	35	2.15201	36	2.17391	37	2.19665	39	60

′	70°		71°		72°		73°		74°		′
0	2.19665	39	2.22029	40	2.24497	42	2.27081	44	2.29793	47	0
1	2.19704	38	2.22069	41	2.24539	42	2.27125	45	2.29840	46	1
2	2.19742	39	2.22110	40	2.24581	43	2.27170	44	2.29886	47	2
3	2.19781	39	2.22150	41	2.24624	42	2.27214	44	2.29933	46	3
4	2.19820	38	2.22191	40	2.24666	42	2.27258	44	2.29979	47	4
5	2.19858	39	2.22231	40	2.24708	42	2.27302	44	2.30026	47	5
6	2.19897	39	2.22271	41	2.24750	43	2.27347	44	2.30073	46	6
7	2.19936	38	2.22312	40	2.24793	42	2.27391	44	2.30119	47	7
8	2.19974	39	2.22352	41	2.24835	42	2.27435	44	2.30166	46	8
9	2.20013	39	2.22393	40	2.24877	42	2.27480	45	2.30212	47	9
10	2.20052	39	2.22433	41	2.24919	43	2.27524	44	2.30259	47	10
11	2.20091	39	2.22474	40	2.24962	42	2.27569	45	2.30306	47	11
12	2 20130	39	2.22514	41	2.25004	43	2.27613	44	2.30353	47	12
13	2.20169	39	2.22555	40	2.25047	42	2.27658	45	2.30400	47	13
14	2.20208	39	2.22595	41	2.25089	43	2.27702	44	2.30447	47	14
15	2.20246	38	2.22636	41	2.25132	43	2.27747	45	2.30494	47	15
16	2.20285	39	2.22677	40	2.25175	42	2.27792	44	2.30541	47	16
17	2.20324	39	2.22717	41	2 25217	43	2.27836	45	2.30588	47	17
18	2.20363	39	2.22758	40	2.25260	42	2 27881	44	2.30635	47	18
19	2.20402	39	2.22798	41	2 25302	43	2.27925	45	2.30682	47	19
20	2.20441	39	2.22839	41	2.25345	43	2.27970	45	2.30729	47	20
21	2 20480	40	2.22880	41	2.25388	43	2.28015	45	2.30776	48	21
22	2.20520	39	2.22921	41	2 25431	43	2.28060	45	2.30824	47	22
23	2.20559	39	2.22962	41	2.25474	43	2.28105	45	2.30871	48	23
24	2.20598	40	2.23003	41	2.25517	43	2.28150	45	2.30919	47	24
25	2.20638	39	2.23044	41	2.25559	42	2.28195	45	2.30966	47	25
26	2.20677	39	2.23085	41	2.25602	43	2.28240	45	2.31013	48	26
27	2.20716	40	2.23126	41	2.25645	43	2.28285	45	2.31061	47	27
28	2.20756	39	2.23167	41	2.25688	43	2.28330	45	2.31108	48	28
29	2.20795	39	2.23208	41	2.25731	43	2.28375	45	2.31156	47	29
30	2.20834	40	2.23249	41	2.25774	43	2.28420	45	2.31203	48	30
31	2.20874	39	2.23290	41	2.25817	43	2.28465	46	2.31251	48	31
32	2 20913	40	2.23331	41	2.25860	43	2.28511	45	2.31299	48	32
33	2.20953	39	2.23373	42	2.25904	44	2.28556	46	2.31347	48	33
34	2.20992	40	2.23414	41	2.25947	43	2.28602	45	2.31395	47	34
35	2.21032	40	2.23455	41	2.25990	43	2.28647	45	2.31442	48	35
36	2.21072	39	2.23497	42	2.26033	43	2.28692	46	2.31490	48	36
37	2.21111	40	2.23538	41	2.26077	44	2.28738	45	2.31538	48	37
38	2.21151	39	2.23580	42	2.26120	43	2.28783	46	2.31586	48	38
39	2.21190	40	2.23621	41	2.26163	43	2.28829	45	2.31634	48	39
40	2.21230	40	2.23662	41	2.26206	43	2.28874	46	2.31682	48	40
41	2.21270	40	2.23704	42	2.26250	44	2.28920	46	2.31730	49	41
42	2.21310	39	2.23745	41	2.26293	43	2.28966	45	2.37779	48	42
43	2.21349	40	2.23787	42	2.26337	44	2.29011	46	2.31827	48	43
44	2.21389	40	9.23828	41	2.26380	43	2.29057	46	2.31875	49	44
45	2.21429	40	2.23870	42	2.26424	44	2.29103	46	2.31924	48	45
46	2.21469	39	8.23912	42	2.26468	44	2.29149	45	2:31972	48	46
47	2.21508	40	2.23953	41	2.26511	43	2.29194	46	2.32020	48	47
48	2.21548	40	2.23995	42	2.26555	44	2.29240	46	2.32068	49	48
49	2.21588	40	2.24036	41	2.26598	43	2.29286	46	2.32117	48	49
50	2.21628	40	2.24078	42	2.26642	44	2.29332	46	2.32165	49	50
51	2.21668	40	2.24120	42	2.26686	44	2.29378	46	2.32214	49	51
52	2.21708	40	2.24162	42	2 26730	44	2.29424	46	2.32263	48	52
53	2.21748	40	2.24204	42	2 26774	44	2.29470	46	2.32311	49	53
54	2.21788	40	2.24246	42	2.26818	44	2.29516	46	2.32360	48	54
55	2.21828	41	2.24287	41	2.26861	43	2.26562	46	2.32408	49	55
56	2.21869	40	2.24329	42	2.26905	44	2.29609	47	2.32457	49	56
57	2.21909	40	2.24371	42	2.26949	44	2.29655	46	2.32506	49	57
58	2.21949	40	2.24413	42	2.26993	44	2.29701	46	2.32555	49	58
59	2.21989	40	2.24455	42	2.27037	44	2.29747	46	2.32603	49	59
60	2.22029		2.24497		2.27081		2.29793		2.32652		60

′	75°		76°		77°		78°		79°		′
0	2.32652	49	2.35678	52	2.38893	55	2.42325	59	2.46011	64	0
1	2.32701	49	2.35730	52	2.38948	56	2.42384	60	2.46075	64	1
2	2.32750	49	2.35782	53	2.39004	55	2.42444	59	2.46139	64	2
3	2.32800	50	2.35835	52	2.39059	56	2.42503	59	2.46203	64	3
4	2.32849	49	2.35887	52	2.39115	56	2.42362	60	2.46267	64	4
5	2.32898	49	2.35939	52	2.39170	55	2.42622	60	2.46332	65	5
6	2.32947	50	2.35991	52	2.39226	56	2.42682	59	2.46396	64	6
7	2.32997	49	2.36043	53	2.39281	55	2.42741	60	2.46460	65	7
8	2.33046	49	2.36096	52	2.39337	56	2.42801	60	2.46525	64	8
9	2.33095	49	2.36148	52	2.39392	56	2.42861	60	2.46589	64	9
10	2.33144	50	2.36200	53	2.39448	56	2.42921	60	2.46653	65	10
11	2.33194	49	2.36253	52	2.39504	56	2.42981	60	2.46718	64	11
12	2.33243	50	2.36305	53	2.39560	56	2.43041	61	2.46782	65	12
13	2.33293	50	2.36358	53	2.39616	57	2.43102	60	2.46847	65	13
14	2.33343	49	2.36411	52	2.39673	56	2.43162	60	2.46912	65	14
15	2.33392	50	2.36463	53	2.39729	56	2.43222	60	2.46977	65	15
16	2.33442	50	2.36516	55	2.39785	56	2.43282	61	2.47042	66	16
17	2.33492	50	2.36569	52	2.39841	57	2.43343	60	2.47108	65	17
18	2.33542	49	2.36621	53	2.39898	56	2.43403	61	2.47173	65	18
19	2.33591	50	2.36674	53	2.39954	56	2.43464	60	2.47238	65	19
20	2.33641	50	2.36727	53	2.40010	57	2.43524	61	2.47303	66	20
21	2.33691	50	2.36780	53	2.40067	57	2.43585	61	2.47369	65	21
22	2.33741	50	2.36833	54	2.40124	57	2.43646	61	2.47434	66	22
23	2.33791	50	2.36887	53	2.40181	57	2.43707	61	2.47500	66	23
24	2.33841	50	2.36940	53	2.40238	57	2.43768	61	2.47566	65	24
25	2.33891	51	2.36993	54	2.40295	57	2.43829	61	2.47631	66	25
26	2.33942	50	2.37047	53	2.40352	57	2.43890	61	2.47697	66	26
27	2.33992	50	2.37100	53	2.40409	57	2.43951	62	2.47763	65	27
28	2.34042	50	2.37153	53	2.40466	57	2.44013	61	2.47828	66	28
29	2.34092	50	2.37206	54	2.40523	57	2.44074	61	2.47894	66	29
30	2.34142	51	2.37260	53	2.40580	58	2.44135	61	2.47960	67	30
31	2.34193	50	2.37313	54	2.40638	57	2.44196	62	2.48027	66	31
32	2.34243	51	2.37367	54	2 40695	58	2.44258	61	2.48093	67	32
33	2.34294	51	2.37421	54	2 40753	57	2.44319	62	2.48160	67	33
34	2.34345	50	2.37475	53	2.40810	58	2.44381	61	2.48227	66	34
35	2.34395	51	2.37528	54	2.40868	57	2.44442	62	2.48293	67	35
36	2.34446	51	2.37582	54	2.40925	58	2.44504	62	2.48360	67	36
37	2.34497	50	2.37636	54	2.40983	57	2.44566	62	2.48427	67	37
38	2.34547	51	2.37690	54	2.41040	58	2.44628	62	2.48494	67	38
39	2.34598	51	2.37744	54	2.41098	57	2.44690	62	2.48561	67	39
40	2.34649	51	2.37798	54	2.41155	58	2.44752	62	2.48628	68	40
41	2.34700	51	2.37852	55	2.41213	58	2.44814	63	2.48696	67	41
42	2.34751	52	2.37907	54	2 41271	58	2.44867	62	2.48763	68	42
43	2.34803	51	2.37961	54	2.41329	58	2.44939	63	2.48831	67	43
44	2.34854	51	2.38015	55	2.41387	58	2.45002	62	2.48898	68	44
45	2.34905	51	2.38070	54	2.41445	58	2.45064	63	2.48966	68	45
46	2.34956	51	2.38124	55	2.41503	59	2.45127	62	2.49034	67	46
47	2.35007	52	2.38179	54	2.41562	58	2.45189	63	2.49101	68	47
48	2.35059	51	2.38233	55	2.41620	58	2.45252	62	2.49169	68	48
49	2.35110	51	2.38288	55	2.41678	58	2.45314	63	2.49237	68	49
50	2.35161	52	2.38343	55	2.41736	59	2.45377	63	2.49305	68	50
51	2.35213	51	2.38398	55	2 41795	58	2.45440	63	2.49373	69	51
52	2.35264	52	2.38453	55	2.41854	58	2.45503	63	2.49442	68	52
53	2.35316	51	2.38508	55	2.41912	59	2.45566	64	2.49510	69	53
54	2.35367	52	2.38563	55	2.41971	59	2.45630	63	2.49579	68	54
55	2.35419	52	2.38618	55	2.42030	59	2.45693	64	2.49647	69	55
56	2.35471	52	2.38673	55	2.42089	59	2.45757	63	2.49716	69	56
57	2.35523	51	2.38728	55	2.42148	59	2.45820	64	2.49785	68	57
58	2.35574	52	2.38783	55	2.42207	59	2.45884	63	2.49853	69	58
59	2.35626	52	2.38838	55	2.42266	59	2.45947	64	2.49922	69	59
60	2.35678		2.38893		2.42325		2.46011		2.49991		60

′	80°		81°		82°		83°		84°		′
0	2.49991	69	2.54317	75	2.59065	83	2.64315	93	2.70184	104	0
1	2.50060	69	2.54392	76	2.59148	84	2.64408	92	2.70288	104	1
2	2.50129	70	2.54468	75	2.59232	83	2.64500	93	2.70392	104	2
3	2.50199	69	2.54543	76	2.59315	83	2.64593	93	2.70496	105	3
4	2.50268	69	2.54619	76	2.59398	84	2.64686	93	2.70601	104	4
5	2.50337	70	2.54695	76	2.59482	84	2.64779	94	2.70705	105	5
6	2.50407	69	2.54771	77	2.59566	84	2.64872	94	2.70810	105	6
7	2.50476	70	2.54848	76	2.59650	84	2.64966	93	2.70915	105	7
8	2.50546	70	2.54924	76	2.59734	85	2.65059	94	2.71020	105	8
9	2.50616	70	2.55000	77	2.59819	84	2.65153	94	2.71125	105	9
10	2.50686	70	2.55077	77	2.59903	85	2.65247	95	2.71230	106	10
11	2.50756	70	2.55154	76	2.59988	84	2.65342	94	2.71336	106	11
12	2.50826	71	2.55230	77	2.60072	85	2.65436	95	2.71442	106	12
13	2.50897	70	2.55307	77	2.60157	85	2.65531	95	2.71548	107	13
14	2.50967	70	2 55384	77	2.60242	85	2.65626	95	2.71655	106	14
15	2.51037	71	2.55461	78	2.60327	85	2.65721	95	2.71761	107	15
16	2.51108	71	2.55539	77	2.60412	86	2.65816	96	2.71868	108	16
17	2.51179	70	2.55616	78	2.60498	85	2.65912	95	2.71976	107	17
18	2.51249	71	2.55694	77	2.60583	86	2.66007	96	2.72083	108	18
19	2.51320	71	2.55771	78	2.60669	85	2.66103	96	2.72191	108	19
20	2.51391	71	2.55849	78	2.60754	86	2.66199	96	2.72299	108	20
21	2.51462	72	2.55927	78	2.60840	86	2.66295	96	2.72407	109	21
22	2.51534	71	2.56005	78	2 60926	87	2.66391	96	2.72516	108	22
23	2.51605	71	2.56083	78	2.61013	86	2.66487	97	2.72624	109	23
24	2.51676	72	2.56161	78	2.61099	87	2.66584	96	2.72733	109	24
25	2.51748	72	2.56239	79	2.61186	87	2.66680	97	2.72842	110	25
26	2.51820	71	2.56318	78	2.61273	87	2.66777	97	2.72952	109	26
27	2.51891	72	2.56396	79	2.61360	87	2.66874	97	2.73061	110	27
28	2.51963	72	2.56475	79	2.61447	87	2.66971	98	2.73171	110	28
29	2.52035	72	2.56554	79	2.61534	87	2.67069	97	2.73281	110	29
30	2.52107	72	2.56633	79	2.61621	88	2.67166	98	2.73391	111	30
31	2.52179	72	2.56712	79	2.61709	87	2.67264	98	2.73502	111	31
32	2.52252	73	2.56791	79	2.61796	88	2.67362	98	2.73613	111	32
33	2.52324	72	2.56870	80	2.61884	88	2.67460	99	2.73724	111	33
34	2.52396	72	2.56950	79	2.61972	88	2.67559	98	2.73835	111	34
35	2.52469	73	2.57029	80	2.62060	88	2.67657	99	2.73946	112	35
36	2.52542	73	2.57109	80	2.62148	89	2.67756	99	2.74058	113	36
37	2.52615	73	2.57189	80	2.62237	88	2.67855	99	2.74171	112	37
38	2.52688	73	2.57269	81	2.62325	89	2.67954	100	2.74283	113	38
39	2.52761	73	2.57350	80	2.62414	89	2.68054	99	2.74396	113	39
40	2.52834	73	2.57430	80	2.62503	89	2.68153	100	2.74509	113	40
41	2.52907	73	2.57510	81	2.62592	90	2.68253	99	2.74622	114	41
42	2.52980	73	2.57591	80	2.62682	89	2.68352	100	2.74736	113	42
43	2.53054	74	2.57671	81	2.62771	89	2.68452	100	2.74849	114	43
44	2.53127	73	2.57752	81	2.62860	90	2.68552	101	2.74963	114	44
45	2.53200	73	2.57833	81	2.62950	89	2.68653	100	2.75077	115	45
46	2.53274	74	2.57914	82	2.63039	90	2.68753	101	2.75192	114	46
47	2.53348	74	2.57996	81	2.63129	90	2.68854	101	2.75306	115	47
48	2.53422	74	2.58077	82	2.63219	90	2.68955	101	2.75421	115	48
49	2.53496	74	2.58159	81	2.63309	91	2.69056	102	2.75536	116	49
50	2.53570	74	2.58240	82	2.63400	90	2.69158	101	2.75652	116	50
51	2.53644	75	2.58322	82	2.63490	91	2.69259	102	2.75768	117	51
52	2.53719	74	2.58404	82	2.63581	91	2.69361	102	2.75885	116	52
53	2.53793	74	2.58486	83	2.63672	91	2.69463	102	2.76001	117	53
54	2.53867	75	2.58569	82	2.63763	92	2.69565	103	2.76118	117	54
55	2.53942	75	2.58651	83	2.63855	91	2.69668	103	2.76235	118	55
56	2.54017	75	2.58734	82	2.63946	92	2.69771	103	2.76353	117	56
57	2.54092	75	2.58816	83	2.64038	92	2.69874	103	2.76470	118	57
58	2.54167	75	2.58899	83	2.64130	92	2.69977	104	2.76588	118	58
59	2.54242	75	2.58982	83	2.64222	93	2.70081	103	2.76706	119	59
60	2.54317		2.59065		2.64315		2.70184		2.76825		60

′	85 ° *)		86 °		87 °		88 °		89 °		′
0	2.76687	133	2.84444	131	2.93174	163	3.03686	190	3.16573	241	0
1	2.76820	132	2.84575	132	2.93337	164	3.03876	191	3.16814	242	1
2	2.76952	132	2.84707	132	2.93501	164	3.04067	192	3.17056	243	2
3	2.77085	133	2.84839	132	2.93665	164	3.04259	192	3.17299	244	3
4	2.77217	132	2.84972	133	2.93829	165	3.04451	193	3.17543	244	4
5	2.77349	132	2.85104	132	2.93994	166	3.04644	194	3.17787	245	5
6	2.77481	132	2.85237	133	2.94160	166	3.04838	194	3.18032	246	6
7	2.77612	131	2.85371	134	2.94326	166	3.05032	195	3.18278	247	7
8	2.77744	132	2.85505	134	2.94492	167	3.05227	196	3.18525	248	8
9	2.77875	131	2.85639	134	2.94659	168	3.05423	197	3.18773	249	9
10	2.78006	131	2.85774	135	2.94827	168	3.05620	198	3.19022	249	10
11	2.78137	131	2.85909	135	2.94995	168	3.05818	198	3.19271	250	11
12	2.78268	131	2.86044	135	2.95163	169	3.06016	199	3.19521	251	12
13	2.78399	131	2.86180	136	2.95332	170	3.06215	200	3.19772	251	13
14	2.78529	130	2.86316	136	2.95502	170	3.06415	200	3.20023	252	14
15	2.78659	130	2.86452	136	2.95672	171	3.06615	201	3.20275	253	15
16	2.78789	130	2.86589	137	2.95843	171	3.06816	202	3.20528	253	16
17	2.78918	129	2.86726	137	2.96014	171	3.07018	203	3.20781	254	17
18	2.79048	130	2.86863	137	2.96185	172	3.07221	203	3.21035	255	18
19	2.79177	129	2.87001	138	2.96357	172	3.07425	204	3.21290	256	19
20	2.79306	129	2.87140	139	2.96529	173	3.07629	205	3.21546	256	20
21	2.79435	129	2.87279	139	2.96702	173	3.07834	207	3.21802	257	21
22	2.79564	129	2.87419	140	2.96875	173	3.08041	207	3.22059	258	22
23	2.79693	129	2.87559	140	2.97048	173	3.08248	208	3.22317	259	23
24	2.79821	128	2.87700	141	2.97221	174	3.08456	209	3.22576	259	24
25	2.79950	129	2.87841	141	2.97395	174	3.08665	210	3.22835	260	25
26	2.80078	128	2.87983	142	2.97569	175	3.08875	210	3.23095	261	26
27	2.80206	128	2.88125	142	2.97744	175	3.09085	212	3.23356	261	27
28	2.80334	128	2.88268	143	2.97919	175	3.09297	213	3.23617	262	28
29	2.80462	128	2.88411	143	2.98094	175	3.09510	214	3.23879	263	29
30	2.80590	128	2.88555	144	2.98269	174	3.09724	215	3.24142	264	30
31	2.80717	127	2.88701	146	2.98443	174	3.09939	216	3.24406	264	31
32	2.80845	128	2.88847	146	2.98617	175	3.10155	217	3.24670	265	32
33	2.80972	127	2.88994	147	2.98792	175	3.10372	219	3.24935	266	33
34	2.81100	128	2.89141	147	2.98967	176	3.10591	219	3.25201	267	34
35	2.81227	127	2.89289	148	2.99143	176	3.10810	220	3.25468	267	35
36	2.81355	128	2.89438	149	2.99319	176	3.11030	221	3.25735	268	36
37	2.81483	128	2.89587	149	2.99495	177	3.11251	222	3.26003	269	37
38	2.81610	127	2.89737	150	2.99672	177	3.11473	223	3.26272	269	38
39	2.81738	128	2.89888	151	2.99849	177	3.11696	224	3.26541	270	39
40	2.81865	127	2.90039	151	3.00026	178	3.11920	225	3.26811	271	40
41	2.81993	128	2.90191	152	3.00204	178	3.12145	225	3.27082	272	41
42	2.82121	128	2.90343	152	3.00382	179	3.12370	226	3.27354	272	42
43	2.82249	128	2.90496	153	3.00561	179	3.12596	228	3.27626	273	43
44	2.82376	127	2.90649	153	3.00740	179	3.12824	228	3.27899	274	44
45	2.82504	128	2.90803	154	3.00919	180	3.13052	229	3.28173	275	45
46	2.82632	128	2.90957	154	3.01099	181	3.13281	230	3.28448	275	46
47	2.82760	128	2.91112	155	3.01280	182	3.13511	230	3.28723	276	47
48	2.82888	128	2.91267	155	3.01462	182	3.13741	231	3.28999	277	48
49	2.83017	129	2.91423	156	3.01644	183	3.13972	233	3.29276	277	49
50	2.83146	129	2.91579	156	3.01827	183	3.14205	233	3.29553	278	50
51	2.83275	129	2.91736	157	3.02010	184	3.14438	234	3.29831	279	51
52	2.83404	129	2.91894	158	3.02194	184	3.14672	235	3.30110	280	52
53	2.83533	129	2.92052	158	3.02378	185	3.14907	235	3.30390	280	53
54	2.83662	129	2.92211	159	3.02563	186	3.15142	236	3.30670	281	54
55	2.83792	130	2.92370	159	3.02749	186	3.15378	237	3.30951	282	55
56	2.83922	130	2.92530	160	3.02935	187	3.15615	238	3.31233	283	56
57	2.84052	130	2.92690	160	3.03122	187	3.15853	239	3.31516	283	57
58	2.84183	131	2.92851	161	3.03309	188	3.16092	240	3.31799	284	58
59	2.84313	130	2.93012	161	3.03497	189	3.16332	241	3.32083	285	59
60	2.84444	131	2.93174	162	3.03686		3.16573		3.32368		60

*) Von hier an sind die Werthe nach Beobachtungen von Argelander abgeleitet.

z.	A.	λ	z.	A.	λ
45°	—	1.0018	80° 0′	1.0041	1.0420
46	—	1.0019	10	1.0042	1.0431
47	—	1.0019	20	1.0043	1.0442
48	—	1.0020	30	1.0045	1.0454
49	—	1.0021	40	1.0046	1.0466
50	—	1.0023	50	1.0047	1.0479
51	—	1.0025	81 0	1.0049	1.0493
52	—	1.0026	10	1.0050	1.0508
53	—	1.0027	20	1.0052	1.0523
54	—	1.0029	30	1.0054	1.0540
55	—	1.0031	40	1.0056	1.0559
56	—	1.0034	50	1.0058	1.0579
57	—	1.0037	82 0	1.0060	1.0600
58	—	1.0040	10	1.0062	1.0622
59	—	1.0043	20	1.0065	1.0646
60	—	1.0046	30	1.0067	1.0671
61	—	1.9049	40	1.0070	1.0697
62	—	1.0054	50	1.0073	1.0725
63	—	1.0058	83 0	1.0075	1.0754
64	—	1.0063	10	1.0078	1.0784
65	—	1.0068	20	1.0081	1.0815
66	—	1.0075	30	1.0084	1.0846
67	—	1.0083	40	1.0088	1.0879
68	—	1.0092	50	1.0092	1.0914
69	—	1.0101	84 0	1.0096	1.0951
70	—	1.0111	10	1 0100	1.0992
71	—	1.0124	20	1.0105	1.1036
72	—	1.0139	30	1.0110	1.1082
73	—	1.0156	40	1.0115	1.1130
74	—	1.0175	50	1.0121	1.1178
75 0′	—	1.0197	85 0	1.0127	1.1229
10	—	1.0200	10	1.0133	1.1285
20	—	1.0204	20	1.0140	1.1344
30	—	1.0208	30	1.0147	1.1408
40	—	1.0212	40	1.0155	1.1475
50	—	1.0216	50	1.0163	1.1547
76 0	—	1.0220	86 0	1.0172	1.1624
10	—	1.0225	10	1.0182	1.1706
20	—	1.0230	20	1.0193	1.1794
30	—	1.0235	30	1.0204	1.1888
40	—	1.0241	40	1.0216	1.1989
50	—	1.0246	50	1.0230	1.2098
77 0	1.0026	1.0252	87 0	1.0244	1.2215
10	1.0026	1.0258	10	1.0260	1.2341
20	1.0027	1.0264	20	1.0278	1.2477
30	1.0027	1.0272	30	1.0298	1.2624
40	1.0028	1.0281	40	1.0320	1.2783
50	1.0029	1.0290	50	1.0343	1.2955
78 0	1.0030	1 0299	88 0	1.0368	1.3141
10	1.0030	1.0308	10	1.0397	1.3341
20	1.0031	1.0318	20	1.0428	1.3559
30	1.0032	1.0328	30	1.0465	1.3797
40	1.0033	1.0338	40	1.0504	1.4056
50	1.0034	1.0347	50	1.0547	1.4341
79 0	1.0035	1.0357	89 0	1.0593	1.4653
10	1.0036	1.0367	10	1.0649	1.4996
20	1.0037	1.0377	20	1.0711	1.5373
30	1.0038	1.0387	30	1.0780	1.5789
40	1.0039	1.0398	40	1.0857	1.6246
50	1.0040	1.0409	50	1.0942	1.6750
60	1.0041	1.0420	60	1.1034	1.7304

Grade F.	log. T.	Grade	Réaumur log. T.	Centes log. T.
− 30 °	+ 0.00242	− 25 °	+ 0.00220	+ 0.00176
− 28	+ 0.00234	− 24	+ 0.00211	+ 0.00169
− 26	+ 0.00226	− 23	+ 0.00202	+ 0.00162
− 24	+ 0.00219	− 22	+ 0.00194	+ 0.00154
− 22	+ 0.00211	− 21	+ 0.00185	+ 0.00147
− 20	+ 0.00203	− 20	+ 0.00176	+ 0.00140
− 18	+ 0.00195	− 19	+ 0.00167	+ 0.00133
− 16	+ 0.00187	− 18	+ 0.00158	+ 0.00126
− 14	+ 0.00180	− 17	+ 0.00150	+ 0.00119
− 12	+ 0.00172	− 16	+ 0.00141	+ 0.00112
− 10	+ 0.00164	− 15	+ 0.00132	+ 0.00105
− 8	+ 0.00156	− 14	+ 0.00123	+ 0.00098
− 6	+ 0.00148	− 13	+ 0.00114	+ 0.00091
− 4	+ 0.00141	− 12	+ 0.00106	+ 0.00084
− 2	+ 0.00133	− 11	+ 0.00097	+ 0.00077
0	+ 0.00125	− 10	+ 0.00088	+ 0.00070
+ 2	+ 0.00117	− 9	+ 0.00079	+ 0.00063
+ 4	+ 0.00109	− 8	+ 0.00070	+ 0.00056
+ 6	+ 0.00102	− 7	+ 0.00062	+ 0.00049
+ 8	+ 0.00094	− 6	+ 0.00053	+ 0.00042
+ 10	+ 0.00086	− 5	+ 0.00044	+ 0.00035
+ 12	+ 0.00078	− 4	+ 0.00035	+ 0.00028
+ 14	+ 0.00070	− 3	+ 0.00026	+ 0.00021
+ 16	+ 0.00063	− 2	+ 0.00018	+ 0.00014
+ 18	+ 0.00055	− 1	+ 0.00009	+ 0.00007
+ 20	+ 0.00047	0	0.00000	0.00000
+ 22	+ 0.00039	+ 1	− 0.00009	− 0.00007
+ 24	+ 0.00031	+ 2	− 0.00018	− 0.00014
+ 26	+ 0.00024	+ 3	− 0.00026	− 0.00021
+ 28	+ 0.00016	+ 4	− 0.00035	− 0.00028
+ 30	+ 0.00008	+ 5	− 0.00044	− 0.00035
+ 32	0.00000	+ 6	− 0.00053	− 0.00042
+ 34	− 0.00008	+ 7	− 0.00062	− 0.00049
+ 36	− 0.00015	+ 8	− 0.00070	− 0.00056
+ 38	− 0 00023	+ 9	− 0.00079	− 0.00063
+ 40	− 0.00031	+ 10	− 0.00088	− 0.00070
+ 42	− 0.00039	+ 11	− 0.00097	− 0.00077
+ 44	− 0.00047	+ 12	− 0.00105	− 0.00084
+ 46	− 0.00054	+ 13	− 0.00114	− 0.00091
+ 48	− 0.00062	+ 14	− 0.00122	− 0.00098
+ 50	− 0.00070	+ 15	− 0.00131	− 0.00105
+ 52	− 0.00078	+ 16	− 0.00140	− 0.00112
+ 54	− 0.00086	+ 17	− 0.00149	− 0.00119
+ 56	− 0.00093	+ 18	− 0.00157	− 0.00126
+ 58	− 0.00101	+ 19	− 0.00166	− 0.00133
+ 60	− 0.00109	+ 20	− 0.00175	− 0.00140
+ 62	− 0.00117	+ 21	− 0.00184	− 0.00147
+ 64	− 0.00125	+ 22	− 0.00192	− 0.00154
+ 66	− 0.00132	+ 23	− 0 00201	− 0.00161
+ 68	− 0.00140	+ 24	− 0.00209	− 0.00168
+ 70	− 0.00148	+ 25	− 0.00218	− 0.00175
+ 72	− 0.00156	+ 26	− 0.00227	− 0.00182
+ 74	− 0.00163	+ 27	− 0.00236	− 0.00189
+ 76	− 0.00171	+ 28	− 0.00244	− 0.00196
+ 78	− 0.00178	+ 29	− 0.00253	− 0.00203
+ 80	− 0.00186	+ 30	− 0.00262	− 0.00210
+ 82	− 0.00194	+ 31	− 0.00271	− 0.00217
+ 84	− 0·00202	+ 32	− 0.00279	− 0.00224
+ 86	− 0.00209	+ 33	− 0.00288	− 0.00230
+ 88	− 0.00217	+ 34	− 0.00296	− 0.00237
+ 90	− 0.00225	+ 35	− 0.00305	− 0.00244

Pariser Linien	Par. Zoll u. Lin.	log. B.	Par. Linien	Par. Zoll u. Lin.	log. B.	Par. Linien	Par. Zoll u. Lin.	log. B.
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315.0	26 3.0	— 0.02445	321.0	26 9.0	— 0.01625	327.0	27 3.0	— 0.00821
315.1	3.1	0.02431	321.1	9.1	0.01611	327.1	3.1	0.00808
315.2	3.2	0.02417	321.2	9.2	0.01598	327.2	3.2	0.00795
315.3	3.3	0.02404	321.3	9.3	0.01584	327.3	3.3	0 00781
315.4	3.4	0.02390	321.4	9.4	0.01571	327.4	3.4	0.00768
315.5	3.5	0.02376	321.5	9.5	0.01557	327.5	3.5	0 00755
315.6	3.6	0.02362	321.6	9.6	0.01544	327.6	3.6	0.00742
315.7	3.7	0.02348	321.7	9.7	0.01530	327.7	3.7	0.00729
315.8	3.8	0 02335	321.8	9.8	0.01517	327.8	3.8	0.00715
315.9	3.9	0.02321	321.9	9.9	0.01503	327.9	3.9	0.00702
316.0	26 4.0	0.02307	322.0	26 10.0	0.01490	328.0	27 4.0	0.00689
316.1	4.1	0.02293	322.1	10.1	0.01477	328.1	4.1	0.00676
316.2	4.2	0.02280	322.2	10.2	0.01463	328.2	4 2	0.00662
316.3	4.3	0.02266	322.3	10.3	0.01450	328.3	4.3	0.00649
316.4	4.4	0.02252	322.4	10.4	0.01436	328.4	4.4	0.00636
316.5	4.5	0.02238	322.5	10.5	0.01423	328.5	4.5	0 00622
316.6	4.6	0.02225	322.6	10.6	0.01410	328.6	4.6	0.00609
316.7	4.7	0.02211	322.7	10.7	0.01396	328.7	4.7	0.00596
316.8	4.8	0.02197	322.8	10.8	0.01383	328.8	4.8	0.00583
316.9	4.9	0.02184	322.9	10.9	0.01369	328.9	4.9	0 00569
317.0	26 5 0	0.02170	323.0	26 11.0	0.01356	329.0	27 5.0	0.00556
317.1	5.1	0.02156	323.1	11.1	0.01342	329.1	5.1	0.00543
317.2	5.2	0.02143	323.2	11.2	0.01329	329.2	5.2	0.00530
317.3	5.3	0.02129	323.3	11.3	0.01315	329 3	5.3	0 00517
317.4	5.4	0.02115	323.4	11.4	0.01302	329.4	5.4	0.00504
317.5	5.5	0.02101	323.5	11.5	0.01288	329.5	5.5	0.00490
317.6	5.6	0.02088	323.6	11.6	0 01275	329.6	5.6	0.00477
317.7	5.7	0.02074	323.7	11.7	0.01261	329.7	5.7	0.00464
317.8	5.8	0.02060	323.8	11.8	0.01248	329.8	5.8	0.00451
317.9	5.9	0.02047	323.9	11.9	0.01234	329.9	5.9	0.00438
318.0	26 6.0	0.02033	324.0	27 0.0	0.01221	330.0	27 6.0	0.00425
318.1	6.1	0.02019	324.1	0.1	0.01208	330.1	6.1	0.00412
318.2	6.2	0.02006	324.2	0.2	0.01194	330.2	6.2	0.00399
318.3	6.3	0.01992	324.3	0.3	0.01181	330.3	6.3	0.00385
318.4	6.4	0.01979	324.4	0.4	0.01168	330.4	6.4	0.00372
318.5	6.5	0.01965	324.5	0.5	0.01154	330.5	6.5	0.00359
318.6	6.6	0.01951	324.6	0.6	0.01141	330.6	6 6	0.00346
318.7	6.7	0.01938	324.7	0.7	0 01128	330.7	6.7	0 00333
318.8	6.8	0.01924	324.8	0.8	0.01115	330.8	6.8	0.00319
318.9	6.9	0.01911	324.9	0.9	0.01101	330.9	6.9	0.00306
319.0	26 7.0	0.01897	325.0	27 1.0	0.01088	331.0	27 7.0	0.00293
319.1	7.1	0.01883	325.1	1.1	0.01075	331.1	7.1	0.00280
319.2	7.2	0.01870	325.2	1.2	0.01061	331.2	7.2	0.00267
319.3	7.3	0.01856	325.3	1.3	0.01048	331.3	7.3	0·00254
319.4	7.4	0.01843	325.4	1.4	0 01034	331.4	7.4	0.00241
319.5	7.5	0.01829	325.5	1.5	0 01021	331.5	7.5	0.00227
319.6	7.6	0.01815	325.6	1.6	0.01008	331.6	7.6	0.00214
319.7	7.7	0.01802	325.7	1.7	0.00994	331.7	7.7	0.00201
319.8	7.8	0.01788	325.8	1.8	0.00981	331.8	7.8	0.00188
319.9	7.9	0.01775	325.9	1.9	0.00967	331.9	7.9	0.00175
320.0	26 8.0	0.01761	326.0	27 2.0	0.00954	332.0	27 8.0	0.00162
320.1	8.1	0.01747	326.1	2.1	0.00941	332.1	8.1	0.00149
320.2	8.2	0.01734	326.2	2.2	0.00927	332.2	8 2	0.00136
320 3	8.3	0.01720	326.3	2.3	0.00914	332.3	8.3	0.00123
320.4	8.4	0.01707	326.4	2.4	0.00901	332.4	8.4	0.00110
320.5	8.5	0.01693	326.5	2.5	0.00887	332.5	8.5	0.00097
320.6	8.6	0.01679	326.6	2.6	0.00874	332.6	8.6	0.00084
320.7	8.7	0.01666	326.7	2.7	0.00861	332.7	8.7	0.00071
320.8	8.8	0.01652	326.8	2.8	0.00848	332.8	8.8	0.00058
320.9	8.9	0.01639	326.9	2.9	0.00834	332.9	8.9	0.00045
321.0	9.0	— 0.01625	327.0	27 3.0	— 0 00821	333.0	27 9.0	— 0.00032

Par. Linien	Par. Zoll u. Lin.	log. B.	Par. Linien	Par. Zoll u. Lin.	log. B.	Par. Linien	Par. Zoll u. Lin.	log. B.
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333.0	27 9.0	− 0.00032	339.0	28 3.0	+ 0.00744	345.0	28 9.0	+ 0.01506
333.1	9.1	0.00019	339.1	3.1	0.00757	345.1	9.1	0.01519
333.2	9.2	− 0.00006	339.2	3.2	0.00770	345.2	9.2	0.01531
333.3	9.3	+ 0.00007	339.3	3.3	0.00782	345.3	9.3	0.01544
333.4	9.4	0.00020	339.4	3.4	0.00795	345.4	9.4	0.01556
333.5	9.5	0.00034	339.5	3.5	0.00808	345.5	9.5	0.01569
333.6	9.6	0.00047	339.6	3.6	0.00821	345.6	9.6	0.01582
333.7	9.7	0.00060	339.7	3.7	0.00834	345.7	9.7	0.01594
333.8	9.8	0.00073	339.8	3.8	0.00846	345.8	9.8	0.01607
333.9	9.9	0.00086	339.9	3.9	0.00859	345.9	9.9	0.01619
334.0	27 10.0	0.00099	340.0	28 4.0	0.00872	346.0	28 10.0	0.01632
334.1	10.1	0.00112	340.1	4.1	0.00885	346.1	10.1	0.01645
334.2	10.2	0.00125	340.2	4.2	0.00897	346.2	10.2	0.01657
334.3	10.3	0.00138	340.3	4.3	0.00910	346.3	10.3	0.01670
334.4	10.4	0.00151	340.4	4.4	0.00923	346.4	10.4	0.01682
334.5	10.5	0.00164	340.5	4.5	0.00936	346.5	10.5	0.01695
334.6	10.6	0.00176	340.6	4.6	0.00948	346.6	10.6	0.01707
334.7	10.7	0.00189	340.7	4.7	0.00961	346.7	10.7	0.01720
334.8	10.8	0.00202	340.8	4.8	0.00974	346.8	10.8	0.01732
334.9	10.9	0.00215	340.9	4.9	0.00986	346.9	10.9	0.01745
335.0	27 11.0	0.00228	341.0	28 5.0	0.00999	347.0	28 11.0	0.01757
335.1	11.1	0.00241	341.1	5.1	0.01012	347.1	11.1	0.01770
335.2	11.2	0.00254	341.2	5.2	0.01025	347.2	11.2	0.01782
335.3	11.3	0.00267	341.3	5.3	0.01037	347.3	11.3	0.01795
335.4	11.4	0.00280	341.4	5.4	0.01050	347.4	11.4	0.01807
335.5	11.5	0.00293	341.5	5.5	0.01063	347.5	11.5	0.01820
335.6	11.6	0.00306	341.6	5.6	0.01076	347.6	11.6	0.01832
335.7	11.7	0.00319	341.7	5.7	0.01089	347.7	11.7	0.01845
335.8	11.8	0.00332	341.8	5.8	0.01101	347.8	11.8	0.01857
335.9	27 11.9	0.00345	341.9	5.9	0.01114	347.9	28 11.9	0.01870
336.0	28 0.0	0.00358	342.0	28 6.0	0.01127	348.0	29 0.0	0.01882
336.1	0.1	0.00371	342.1	6.1	0.01140	348.1	0.1	0.01895
336.2	0.2	0.00384	342.2	6.2	0.01152	348.2	0.2	0.01907
336.3	0.3	0.00397	342.3	6.3	0.01165	348.3	0.3	0.01920
336.4	0.4	0.00410	342.4	6.4	0.01177	348.4	0.4	0.01932
336.5	0.5	0.00423	342.5	6.5	0.01190	348.5	0.5	0.01945
336.6	0.6	0.00435	342.6	6.6	0.01203	348.6	0.6	0.01957
336.7	0.7	0.00448	342.7	6.7	0.01215	348.7	0.7	0.01970
336.8	0.8	0.00461	342.8	6.8	0.01228	348.8	0.8	0.01982
336.9	0.9	0.00474	342.9	6.9	0.01240	348.9	0.9	0.01995
337.0	28 1.0	0.00487	343.0	28 7.0	0.01253	349.0	29 1.0	0.02007
337.1	1.1	0.00500	343.1	7.1	0.01266	349.1	1.1	0.02019
337.2	1.2	0.00513	343.2	7.2	0.01278	349.2	1.2	0.02032
337.3	1.3	0.00526	343.3	7.3	0.01291	349.3	1.3	0.02044
337.4	1.4	0.00539	343.4	7.4	0.01304	349.4	1.4	0.02057
337.5	1.5	0.00552	343.5	7.5	0.01317	349.5	1.5	0.02069
337.6	1.6	0.00564	343.6	7.6	0.01329	349.6	1.6	0.02081
337.7	1.7	0.00577	343.7	7.7	0.01342	349.7	1.7	0.02094
337.8	1.8	0.00590	343.8	7.8	0.01355	349.8	1.8	0.02106
337.9	1.9	0.00603	343.9	7.9	0.01367	349.9	1.9	0.02119
338.0	28 2.0	0.00616	344.0	28 8.0	0.01380	350.0	29 2.0	0.02131
338.1	2.1	0.00629	344.1	8.1	0.01393	350.1	2.1	0.02143
338.2	2.2	0.00642	344.2	8.2	0.01405	350.2	2.2	0.02156
338.3	2.3	0.00654	344.3	8.3	0.01418	350.3	2.3	0.02168
338.4	2.4	0.00667	344.4	8.4	0.01430	350.4	2.4	0.02181
338.5	2.5	0.00680	344.5	8.5	0.01443	350.5	2.5	0.02193
338.6	2.6	0.00693	344.6	8.6	0.01456	350.6	2.6	0.02205
338.7	2.7	0.00706	344.7	8.7	0.01468	350.7	2.7	0.02218
338.8	2.8	0.00718	344.8	8.8	0.01481	350.8	2.8	0.02230
338.9	2.9	0.00731	344.9	8.9	0.01494	350.9	2.9	0.02243
339.0	28 3.0	+ 0.00744	345.0	28 9.0	+ 0.01506	351.0	29 3.0	+ 0.02255

Engl. Zoll	log. B.	Engl. Zoll	log. B.	Engl. Zoll	log. B.
27.50	— 0.03191	28.10	— 0.02254	28.70	— 0.01336
27.51	0.03175	28.11	0.02238	28.71	0.01321
27.52	0.03159	28.12	0.02223	28.72	0.01306
27.53	0.03144	28.13	0.02207	28.73	0.01291
27.54	0.03128	28.14	0.02192	28.74	0.01276
27.55	0.03112	28.15	0.02176	28.75	0.01260
27.56	0.03096	28.16	0.02161	28.76	0.01245
27.57	0.03080	28.17	0.02145	28.77	0.01230
27.58	0.03065	28.18	0.02130	28.78	0.01215
27.59	0.03049	28.19	0.02114	28.79	0.01200
27.60	0.03033	28.20	0.02099	28.80	0.01185
27.61	0.03017	28.21	0.02084	28.81	0.01170
27.62	0.03002	28.22	0.02068	28.82	0.01155
27.63	0.02986	28.23	0.02053	28.83	0.01140
27.64	0.02970	28.24	0.02038	22.84	0.01125
27.65	0.02954	28.25	0.02022	28.85	0.01110
27.66	0.02939	28.26	0.02007	28.86	0.01095
27.67	0.02923	28.27	0.01992	28.87	0.01080
27.68	0.02907	28.28	0.01977	28.88	0.01065
27.69	0.02892	28.29	0.01961	28.89	0.01050
27.70	0.02876	28.30	0.01946	28.90	0.01035
27.71	0.02860	28.31	0.01931	28.91	0.01020
27.72	0.02845	28.32	0.01915	28.92	0.01005
27.73	0.02829	28.33	0.01900	28.93	0.00990
27.74	0.02814	28.34	0 01885	98.94	0.00975
27.75	0.02798	28.35	0.01869	28.95	0.00960
27.76	0.02782	28.36	0.01854	28.96	0.00945
27.77	0.02767	28.37	0.01839	28 97	0.00930
27.78	0.02751	28.38	0.01824	28.98	0.00915
27.79	0.02736	28.39	0.01808	28 99	0.00900
27.80	0.02720	28.40	0.01793	29.00	0.00885
27.81	0.02704	28.41	0.01778	29 01	0.00870
27.82	0.02689	28.42	0.01762	29.02	0.00855
27.83	0.02673	28.43	0.01747	29.03	0.00840
27.84	0.02658	28.44	0.01732	29.04	0.00825
27.85	0.02642	28.45	0.01716	29.05	0.00810
27.86	0.02626	28.46	0.01701	29.06	0.00795
27.87	0.02611	28.47	0.01686	29.07	0.00780
27.88	0.02595	28.48	0.01671	29.08	0.00765
27.89	0.02580	28.49	0.01655	29.09	0.00750
27.90	0.02564	28.50	0.01640	29.10	0.00735
27.91	0.02548	28.51	0.01625	29.11	0.00720
27.92	0.02533	28.52	0.01610	29.12	0.00705
27.93	0.02517	28.53	0.01594	29.13	0.00690
27.94	0.02502	28.54	0.01579	29.14	0.00675
27.95	0.02486	28.55	0.01564	29.15	0.00660
27.96	0.02471	28.56	0.01549	29.16	0.00646
27.97	0.02455	28.57	0.01534	29.17	0.00631
27.98	0.02440	28.58	0.01518	29.18	0.00616
27.99	0.02424	28.59	0.01503	29.19	0.00601
28.00	0.02409	28.60	0.01488	29.20	0.00586
28.01	0.02393	28.61	0.01473	29.21	0.00571
28.02	0.02378	28.62	0.01458	29.22	0.00556
28.03	0.02362	28.63	0.01442	29.23	0.00542
28.04	0.02347	28.64	0.01427	29.24	0.00527
28.05	0.02332	28.65	0.01412	29.25	0.00512
28.06	0.02317	28.66	0.01397	29.26	0.00497
28.07	0.02301	28.67	0.01382	29.27	0.00482
28.08	0.02286	28.68	0.01366	29.28	0.00468
28.09	0.02270	28.69	0.01351	29.29	0.00453
28.10	— 0.02254	28.70	— 0.01336	29.30	— 0.00438

Engl. Zoll	log. B.	Engl. Zoll	log. B.	Engl. Zoll	log. B.
"		"		"	
29.30	− 0 00438	29.90	+ 0.00443	30.50	+ 0.01306
29.31	0.00423	29.91	0.00458	30.51	0.01320
29.32	0 00408	29.92	0.00472	30.52	0 01334
29.33	0.00394	29.93	0.00487	30.53	0.01349
29.34	0.00379	29.94	0.00501	30.54	0.01363
29.35	0.00364	29.95	0.00516	30.55	0.01377
29.36	0.00349	29.96	0.00530	30.56	0.01391
29.37	0.00334	29.97	0.00545	30.57	0.01405
29.38	0.00320	29.98	0.00559	30.58	0.01420
29.39	0.00305	29.99	0.00574	30.59	0.01434
29.40	0.00290	30.00	0.00588	30.60	0.01448
29.41	0.00275	30.01	0.00602	30.61	0.01462
29.42	0.00260	30.02	0.00617	30.62	0.01476
29.43	0.00246	30.03	0.00631	30.63	0.01490
29.44	0.00231	30.04	0.00646	30.64	0.01504
29.45	0.00216	30.05	0.00660	30.65	0.01519
29.46	0 00201	30.06	0.00674	30.66	0.01533
29.47	0.00186	30.07	0.00689	30.67	0.01547
29.48	0.00172	30.08	0.00703	30.68	0.01561
29.49	0.00157	30.09	0.00718	30.69	0.01575
29.50	0.00142	30.10	0.00732	30.70	0.01589
29.51	0.00127	30.11	0.00746	30.71	0.01603
29.52	0.00113	30.12	0.00761	30.72	0.01617
29.53	0.00098	30.13	0.00775	30.73	0.01632
29.54	0.00083	30.14	0.00790	30.74	0.01646
29.55	0.00068	30.15	0.00804	30.75	0.01660
29.56	0.00054	30.16	0.00818	30.76	0.01674
29.57	0.00039	30.17	0.00833	30.77	0.01688
29.58	0.00024	30.18	0.00847	30.78	0.01703
29.59	− 0.00010	30.19	0.00862	30 79	0.01717
29.60	+ 0.00005	30.20	0.00876	30.80	0.01731
29.61	0.00020	30.21	0.00890	30.81	0.01745
29.62	0.00034	30.22	0.00905	30.82	0.01759
29.63	0.00049	30.23	0.00919	30.83	0.01773
29.64	0.00063	30.24	0.00934	30.84	0.01787
29.65	0.00078	30.25	0.00948	30.85	0.01801
29.66	0.00093	30.26	0.00962	30.86	0.01815
29.67	0.00107	30 27	0.00977	30.87	0.01829
29.68	0.00122	30.28	0.00991	30 88	0.01843
29.69	0.00136	30.29	0 01006	30.89	0.01857
29.70	0.00151	30.30	0.01020	30.90	0.01871
29.71	0.00166	30.31	0.01034	30.91	0.01885
29.72	0.00180	30.32	0.01049	30.92	0.01899
29.73	0.00195	30.33	0.01063	30.93	0.01913
29.74	0.00209	30.34	0.01077	30.94	0.01927
29.75	0.00224	30.35	0.01092	30.95	0.01942
29.76	0.00239	30.36	0.01106	30.96	0.01956
29.77	0.00253	30.37	0.01120	30.97	0.01970
29.78	0.00268	30.38	0.01134	30.98	0.01984
29.79	0.00282	30.39	0.01149	30.99	0.01998
29.80	0.00297	30.40	0.01163	31,00	0.02012
29.81	0.00312	30.41	0.01177	31.01	0.02026
29.82	0.00326	30.42	0.01192	31.02	0.02040
29.83	0.00341	30.43	0.01206	31.03	0.02054
29.84	0.00355	30.44	0.01220	31.04	0.02068
29.85	0.00370	30.45	0.01235	31.05	0.02083
29.86	0.00385	30.46	0.01249	31.06	0.02097
29.87	0.00399	30.47	0.01263	31.07	0.02111
29.88	0.00414	30.48	0.01277	31.08	0.02125
29.89	0.00428	30.49	0.01292	31.09	0.02139
29.90	+ 0.00443	30.50	+ 0.01306	31.10	+ 0.02153

Millimeter	log. B.	Millimeter	log. B.	Millimeter	log. B.	Millimeter	log. B.
720.0	−0.01860	726.0	−0.01500	732.0	−0.01142	738.0	−0.00788
720.1	0.01854	726.1	0.01494	732.1	0.01136	738.1	0.00782
720.2	0.01848	726.2	0.01488	732.2	0.01130	738.2	0.00776
720.3	0.01842	726.3	0.01482	732.3	0.01124	738.3	0.00770
720.4	0.01836	726.4	0.01476	732.4	0.01118	738.4	0.00764
720.5	0.01830	726.5	0.01470	732.5	0.01112	738.5	0.00759
720.6	0.01824	726.6	0.01464	732.6	0.01107	738.6	0.00753
720.7	0.01818	726.7	0.01458	732.7	0.01101	738.7	0.00747
720.8	0.01812	726.8	0.01452	732.8	0.01095	738.8	0.00741
720.9	0.01806	726.9	0.01446	732.9	0.01089	738.9	0.00735
721.0	0.01800	727.0	0.01440	733.0	0.01083	739.0	0.00729
721.1	0.01794	727.1	0.01434	733.1	0.01077	739.1	0.00723
721.2	0.01788	727.2	0.01428	733.2	0.01071	739.2	0.00717
721.3	0.01782	727.3	0.01422	733.3	0.01065	739.3	0.00711
721.4	0.01776	727.4	0.01416	733.4	0.01059	739.4	0.00705
721.5	0.01769	727.5	0.01410	733.5	0.01053	739.5	0.00699
721.6	0.01763	727.6	0.01404	733.6	0.01048	739.6	0.00694
721.7	0.01757	727.7	0.01398	733.7	0.01042	739.7	0.00688
721.8	0.01751	727.8	0.01392	733.8	0.01036	739.8	0.00682
721.9	0.01745	727.9	0.01386	733.9	0.01030	739.9	0.00676
722.0	0.01739	728.0	0.01380	734.0	0.01024	740.0	0.00670
722.1	0.01733	728.1	0.01374	734.1	0.01018	740.1	0.00664
722.2	0.01727	728.2	0.01368	734.2	0.01012	740.2	0.00658
722.3	0.01721	728.3	0.01362	734.3	0.01006	740.3	0.00653
722.4	0.01715	728.4	0.01356	734.4	0.01000	740.4	0.00647
722.5	0.01709	728.5	0.01350	734.5	0.00994	740.5	0.00641
722.6	0.01703	728.6	0.01345	734.6	0.00989	740.6	0.00635
722.7	0.01697	728.7	0.01339	734.7	0.00983	740.7	0.00629
722.8	0.01691	728.8	0.01333	734.8	0.00977	740.8	0.00624
722.9	0.01685	728.9	0.01327	734.9	0.00971	740.9	0.00618
723.0	0.01679	729.0	0.01321	735.0	0.00965	741.0	0.00612
723.1	0.01673	729.1	0.01315	735.1	0.00959	741.1	0.00606
723.2	0.01667	729.2	0.01309	735.2	0.00953	741.2	0.00600
723.3	0.01661	729.3	0.01303	735.3	0.00947	741.3	0.00594
723.4	0.01655	729.4	0.01297	735.4	0.00941	741.4	0.00588
723.5	0.01649	729.5	0.01291	735.5	0.00935	741.5	0.00582
723.6	0.01643	729.6	0.01285	735.6	0.00930	741.6	0.00577
723.7	0.01637	729.7	0.01279	735.7	0.00924	741.7	0.00571
723.8	0.01631	729.8	0.01273	735.8	0.00918	741.8	0.00565
723.9	0.01625	729.9	0.01267	735.9	0.00912	741.9	0.00559
724.0	0.01619	730.0	0.01261	736.0	0.00906	742.0	0.00553
724.1	0.01613	730.1	0.01255	736.1	0.00900	742.1	0.00547
724.2	0.01607	730.2	0.01249	736.2	0.00894	742.2	0.00541
724.3	0.01601	730.3	0.01243	736.3	0.00888	742.3	0.00535
724.4	0.01595	730.4	0.01237	736.4	0.00882	742.4	0.00529
724.5	0.01589	730.5	0.01231	736.5	0.00876	742.5	0.00523
724.6	0.01584	730.6	0.01226	736.6	0.00871	742.6	0.00518
724.7	0.01578	730.7	0.01220	736.7	0.00865	742.7	0.00512
724.8	0.01572	730.8	0.01214	736.8	0.00859	742.8	0.00506
724.9	0.01566	730.9	0.01208	736.9	0.00853	742.9	0.00500
725.0	0.01560	731.0	0.01202	737.0	0.00847	743.0	0.00494
725.1	0.01554	751.1	0.01196	737.1	0.00841	743.1	0.00488
725.2	0.01548	731.2	0.01190	737.2	0.00835	743.2	0.00482
725.3	0.01542	731.3	0.01184	737.3	0.00829	743.3	0.00477
725.4	0.01536	731.4	0.01178	737.4	0.00823	743.4	0.00471
725.5	0.01530	731.5	0.01172	737.5	0.00817	743.5	0.00465
725.6	0.01524	731.6	0.01166	737.6	0.00812	743.6	0.00459
725.7	0.01518	731.7	0.01160	737.7	0.00806	743.7	0.00453
725.8	0.01512	731.8	0.01154	727.8	0.00800	743.8	0.00448
725.9	0.01506	731.9	0.01148	737.9	0.00794	743.9	0.00442
726.0	−0.01500	732.0	−0.01142	738.0	−0.00788	744.0	−0.00436

Millimeter	log. B.	Millimeter	log. B.	Millimeter	log. B.
744.0	− 0.00436	750.0	− 0.00087	756.0	+ 0.00259
744.1	0.00430	750.1	0.00081	756.1	0.00265
744.2	0.00424	750.2	0.00075	756.2	0.00270
744.3	0.00419	750.3	0.00070	756.3	0.00276
744.4	0.00413	750.4	0.00064	756.4	0.00282
744.5	0.00407	750.5	0.00058	756.5	0.00288
744.6	0.00401	750.6	0.00052	756.6	0.00293
744.7	0.00395	750.7	0.00046	756.7	0.00299
744.8	0.00390	750.8	0.00041	756.8	0.00305
744.9	0.00384	750.9	0.00035	756.9	0.00310
745.0	0.00378	751.0	0.00029	757.0	0.00316
745.1	0.00372	751.1	0.00023	757.1	0.00322
745.2	0.00366	751.2	0.00018	757.2	0.00328
745.3	0.00360	751.3	0.00012	757.3	0.00333
745.4	0.00354	751.4	− 0.00006	757.4	0.00339
745.5	0.00348	751.5	0.00000	757.5	0.00345
745.6	0.00343	751.6	+ 0.00005	757.6	0.00351
745.7	0.00337	751.7	0.00011	757.7	0.00357
745.8	0.00331	751.8	0.00017	757.8	0.00362
745.9	0.00325	751.9	0.00022	757.9	0.00368
746.0	0.00319	752.0	0.00028	758.0	0.00374
746.1	0.00313	752.1	0.00034	758.1	0.00380
746.2	0.00307	752.2	0.00040	758.2	0.00385
746.3	0.00302	752.3	0.00045	758.3	0.00391
746.4	0.00296	752.4	0.00051	758.4	0.00397
746.5	0.00290	752.5	0.00057	758.5	0.00403
746.6	0.00284	752.6	0.00063	758.6	0.00408
746.7	0.00278	752.7	0.00069	758.7	0.00414
746.8	0.00273	752.8	0.00074	758.8	0.00420
746.9	0.00267	752.9	0.00080	758.9	0.00425
747.0	0.00261	753.0	0.00086	759.0	0.00431
747.1	0.00255	753.1	0.00092	759.1	0.00437
747.2	0.00249	753.2	0.00098	759.2	0.00442
747.3	0.00244	753.3	0.00103	759.3	0.00448
747.4	0.00238	753.4	0.00109	759.4	0.00454
747.5	0.00232	753.5	0.00115	759.5	0.00460
747.6	0.00226	753.6	0.00121	759.6	0.00465
747.7	0.00220	753.7	0.00127	759.7	0.00471
747.8	0.00215	753.8	0.00132	759.8	0.00477
747.9	0.00209	753.9	0.00138	759.9	0.00482
748.0	0.00203	754.0	0.00144	760.0	0.00488
748.1	0.00197	754.1	0.00150	760.1	0.00494
748.2	0.00191	754.2	0.00155	760.2	0.00499
748.3	0.00186	754.3	0.00161	760.3	0.00505
748.4	0.00180	754.4	0.00167	760.4	0.00511
748.5	0.00174	754.5	0.00173	760.5	0.00517
748.6	0.00168	754.6	0.00178	760.6	0.00522
748.7	0.00162	754.7	0.00184	760.7	0.00528
748.8	0.00157	754.8	0.00190	760.8	0.00534
748.9	0.00151	754.9	0.00195	760.9	0.00539
749.0	0.00145	755.0	0.00201	761.0	0.00545
749.1	0.00139	755.1	0.00207	761.1	0.00551
749.2	0.00133	755.2	0.00213	761.2	0.00556
749.3	0.00128	755.3	0.00218	761.3	0.00562
749.4	0.00122	755.4	0.00224	761.4	0.00568
749.5	0.00116	755.5	0.00230	761.5	0.00574
749.6	0.00110	755.6	0.00236	761.6	0.00579
749.7	0.00105	755.7	0.00242	761.7	0.00585
749.8	0.00099	755.8	0.00247	761.8	0.00591
749.9	0.00093	755.9	0.00253	761.9	0.00596
750.0	− 0.00087	756.0	+ 0.00259	762.0	+ 0.00602

Millimeter	log. B.	Millimeter	log. B.	Millimeter	log. B.
762.0	+ 0.00602	768.0	+ 0.00943	774.0	+ 0.01281
762.1	0.00608	768.1	0.00949	774.1	0.01287
762.2	0.00613	768.2	0.00954	774.2	0.01292
762.3	0.00619	768.3	0.00960	774 3	0.01298
762.4	0.00625	768.4	0.00965	774.4	0.01303
762.5	0.00631	768.5	0.00971	774.5	0.01309
762.6	0.00636	768.6	0.00977	774.6	0.01315
762.7	0.00642	768.7	0.00982	774 7	0.01320
762.8	0.00648	768.8	0.00988	774.8	0.01326
762.9	0.00653	768.9	0.00993	774.9	0.01331
763.0	0.00659	769.0	0.00999	775.0	0.01337
763.1	0.00665	769.1	0.01005	775.1	0.01343
763.2	0.00670	769.2	0.01010	775.2	0.01348
763.3	0.00676	769.3	0.01016	775.3	0.01354
763.4	0.00682	769.4	0.01022	775.4	0.01359
763.5	0.00688	769.5	0.01028	775.5	0.01365
763.6	0.00693	769.6	0.01033	775.6	0.01371
763.7	0.00699	769.7	0.01039	775.7	0.01376
763.8	0.00705	769.8	0.01045	775.8	0.01382
763.9	0.00710	769.9	0.01050	775.9	0.01387
764.0	0.00716	770.0	0.01056	776.0	0.01393
764.1	0.00722	770.1	0.01062	776.1	0.01399
764.2	0.00727	770 2	0.01067	776.2	0.01404
764.3	0.00733	770.3	0.01073	766.3	0.01410
764.4	0.00739	770 4	0.01078	776.4	0.01415
764.5	0.00745	770.5	0.01084	776.5	0.01421
764.6	0.00750	770.6	0.01090	776.6	0.01427
764.7	0.00756	770.7	0.01095	776.7	0.01432
764.8	0.00762	770.8	0.01101	776.8	0.01438
764.9	0.00767	770.9	0.01106	776.9	0.01443
765.0	0.00773	771.0	0.01112	777.0	0.01449
765.1	0.00779	771.1	0.01118	777.1	0.01455
765.2	0.00784	771.2	0.01123	777.2	0.01460
765.3	0.00790	771.3	0.01129	777.3	0.01466
765.4	0.00796	771.4	0.01134	777.4	0.01471
765.5	0.00802	771.5	0.01140	777.5	0.01477
765.6	0.00807	771.6	0.01146	777.6	0.01483
765.7	0.00813	771.7	0.01151	777.7	0.01488
765.8	0.00819	771.8	0.01157	777.8	0.01494
765.9	0.00824	771.9	0.01162	777.9	0.01499
766.0	0.00830	772.0	0.01168	778.0	0.01505
766.1	0.00836	772.1	0.01174	778.1	0.01511
766.2	0.00841	772.2	0.01179	778.2	0.01516
766.3	0.00847	772.3	0.01185	778.3	0.01522
766.4	0.00852	772.4	0.01191	778.4	0.01527
766.5	0.00858	772.5	0.01197	778.5	0.01533
766.6	0.00864	772.6	0.01202	778.6	0.01538
766.7	0.00869	772.7	0.01208	778.7	0.01544
766.8	0.00875	772.8	0.01214	778.8	0.01549
766.9	0.00880	772.9	0.01219	778.9	0.01555
767.0	0.00886	773 0	0.01225	779.0	0.01560
767.1	0.00892	773.1	0.01231	779.1	0.01566
767.2	0.00897	773.2	0.01236	779.2	0.01571
767.3	0.00903	773.3	0.01242	779.3	0.01577
767.4	0.00909	773.4	0.01247	779.4	0.01582
767.5	0.00915	773.5	0.01253	779.5	0.01588
767.6	0.00920	773.6	0.01259	779.6	0.01594
767.7	0.00926	773.7	0.01264	779.7	0.01599
767.8	0.00932	773.8	0.01270	779.8	0.01605
767.9	0.00937	773.9	0.01275	779.9	0.01610
768.0	+ 0.00943	774.0	+ 0.01281	780.0	+ 0.01616

F.	log. γ	Diff.	F.	log. γ	Diff.	F.	log. γ	Diff.
−25°	+0.06773	99	15°	+0.02969	91	55°	−0.00528	84
24	06674	99	16	02878	91	56	00612	84
23	06575	99	17	02787	90	57	00696	84
22	06476	99	18	02697	91	58	00780	83
21	06377	98	19	02606	90	59	00863	83
20	06279	98	20	02516	90	60	00946	83
19	06181	98	21	02426	90	61	01029	83
18	06083	98	22	02336	89	62	01112	83
17	05985	98	23	02247	90	63	01195	83
16	05887	97	24	02157	89	64	01278	82
15	05790	97	25	02068	89	65	01360	83
14	05693	97	26	01979	89	66	01443	82
13	05596	96	27	01890	89	67	01525	82
12	05500	97	28	01801	88	68	01607	82
11	05403	96	29	01713	89	69	01689	81
10	05307	96	30	01624	88	70	01770	82
9	05211	96	31	01536	88	71	01852	81
8	05115	95	32	01448	88	72	01933	82
7	05020	96	33	01360	87	73	02015	81
6	04924	95	34	01273	88	74	02096	81
5	04829	95	35	01185	87	75	02177	80
4	04734	94	36	01098	87	76	02257	81
3	04640	95	37	01011	87	77	02338	81
2	04545	94	38	00924	87	78	02419	80
1	04451	94	39	00837	87	69	02499	80
− 0	04357	94	40	00750	86	80	02579	80
1	04263	94	41	00664	86	81	02659	79
+ 2	04169	93	42	00578	86	82	02738	80
3	04076	94	43	00492	86	83	02818	80
4	03982	93	44	00406	86	84	02898	80
5	03889	93	45	00320	86	85	02978	79
6	03796	92	46	00234	85	86	03057	79
7	03704	93	47	00149	85	87	03136	80
8	03611	92	48	+0.00064	85	88	03216	78
9	03519	92	49	−0.00021	85	89	03294	79
10	03427	92	50	00106	85	90	03373	79
11	03335	92	51	00191	84	91	03452	78
12	03243	91	52	00275	85	92	03530	79
13	03152	92	53	00360	84	93	03609	78
14	03060	91	54	00444	84	94	03687	78
15	+0.02969		55	−0.00528		95	−0.03765	

Grade.	Réaumur. log. γ.	Diff.	Centes. log. γ.	Diff.	Grade.	Réaumur. log. γ.	Diff.	Centes. log. γ.	Diff.
—	+		+						
35	0.08990	235	0.07373	181	0°	+0.01448	197	+0.01448	158
34	08755	233	07192	180	+1	01251	197	01290	157
33	08522	232	07012	179	2	01054	195	01133	157
32	08290	231	06833	179	3	00859	195	00976	156
31	08059	230	06654	178	4	00664	194	00820	156
30	07829		06476		5	00470		00664	
		228		178			193		155
29	07601	228	06298	176	6	00277	192	00509	155
28	07373	226	06122	176	7	+0.00085	191	00354	154
27	07147	225	05946	175	8	−0.00106	191	00200	153
26	06922	224	05771	175	9	00297	189	+0.00047	153
25	06698		05596		10	00486		−0.00106	
		222		173			189		153
24	06476	222	05423	174	11	00675	188	00259	151
23	06254	220	05249	172	12	00863	187	00410	152
22	06034	219	05077	172	13	01050	186	00562	151
21	05815	218	04905	171	14	01236	186	00713	150
20	05596		04734		15	01422		00863	
		217		170			185		150
19	05379	216	04564	170	16	01607	184	01013	149
18	05163	215	04394	169	17	01791	183	01162	149
17	04948	214	04225	168	18	01974	182	01311	148
16	04734	212	04057	168	19	02156	182	01459	148
15	04522		03889		20	02338		01607	
		212		167			181		147
14	04310	211	03722	166	21	02519	180	01754	147
13	04099	210	03556	166	22	02699	180	01901	146
12	03889	208	03390	165	23	02879	178	02047	145
11	03681	208	03225	165	24	03057	178	02192	146
10	03473		03060		25	03235		02338	
		207		164			177		145
9	03266	206	02896	163	26	03412	177	02483	144
8	03060	205	02733	163	27	03589	176	02627	144
7	02855	203	02570	162	28	03765	175	02771	143
6	02652	203	02408	161	29	03940	174	02914	143
5	02449		02247		30	04114		03057	
		202		161			174		143
4	02247	201	02086	160	31	04288	173	03200	142
3	02046	200	01926	160	32	04461	172	03342	141
2	01846	200	01766	159	33	04633	172	03483	141
1	01646	198	01607	159	34	04805	171	03624	141
0	0.01448		0.01448		35	−0.04976		−0.03765	
—	+		+						

Geogr. Breite	Geogr. Breite — Verb. Breite		log. Entfernung v. Centr.		Geogr. Breite	Geogr. Breite — Verb. Breite		log. Entfernung v. Centr.	
° ′	′ ″	″			° ′	′ ″	″		
0 0	0 0.00	4.00	0 0000000		10 0	3 56.47	3.77	9.9999566	
10	4.00	4.01	0.0000000	0	10	59.24	3.75	551	15
20	8.01	4.00	0.0000000	0	20	4 2.99	3.75	537	14
30	12.01	4.01	9.9999999	1	30	6.74	3.75	522	15
40	16.02	4.00	998	1	40	10.47	3.73	507	15
50	20.02	4.00	997	1	50	14.20	3.73	491	16
1 0	0 24.02	4.00	9.9999996	1	11 0	4 17.92	3.72	9.9999476	15
10	28.02	4.00	994	2	10	21.63	3.71	460	16
20	32.03	4.01	992	2	20	25.34	3.71	444	16
30	36.03	4.00	990	2	30	29.03	3.69	428	16
40	40.02	3.99	988	2	40	32.71	3.68	411	17
50	44.02	4.00	985	3	50	36.39	3.68	394	17
2 0	0 48.02	3.99	9.9999982	3	12 0	4 40.06	3.67	9.9999377	17
10	52.01	3.99	979	3	10	43.71	3.65	360	17
20	56.00	3.99	976	3	20	47.36	3.65	343	17
30	59.99	3.99	973	3	30	51.00	3.64	325	18
40	1 3.98	3.99	969	4	40	54.63	3.63	307	18
50	7.97	3.98	965	4	50	58.24	3.61	289	18
3 0	1 11.95	3.98	9.9999961	5	13 0	5 1.85	3.61	9.9999271	18
10	15.93	3.98	956	5	10	5.45	3.60	253	18
20	19.91	3.98	951	5	20	9.04	3.59	234	19
30	23.89	3.98	946	5	30	12.62	3.58	215	19
40	27.86	3.97	941	5	40	16.18	3.56	196	19
50	31.83	3.97	936	6	50	19.74	3.56	177	19
4 0	1 35.80	3.97	9.9999930	6	14 0	5 23.28	3.54	9.9999157	20
10	39.77	3.96	924	6	10	26.82	3.54	137	20
20	43.73	3.96	918	7	20	30.34	3.52	117	20
30	47.69	3.96	911	6	30	33.86	3.52	097	20
40	51.64	3.95	905	7	40	37.36	3.50	076	21
50	55.59	3.95	898	7	50	40.85	3.49	056	20
5 0	1 59.54	3.94	9.9999891	8	15 0	5 44.33	3.48	9.9998035	21
10	2 3.48	3.94	883	7	10	47.79	3.46	9014	21
20	7.42	3.93	876	8	20	51.25	3.46	8993	21
30	11.35	3.93	868	8	30	54.69	3.44	8971	22
40	15.28	3.93	860	9	40	58 12	3.43	8949	22
50	19.20	3.92	851	8	50	6 1.54	3.42	8928	21
6 0	2 23.12	3.92	9.9999843	9	16 0	6 4.95	3.41	9.9998905	23
10	27.04	3.92	834	9	10	8.35	3.40	8883	22
20	30.95	3.91	825	10	20	11.73	3.38	8861	22
30	34.86	3.91	815	9	30	15.10	3.37	8838	23
40	38.76	3.90	806	10	40	18.46	3.36	8815	23
50	42.65	3.89	796	10	50	21 80	3.34	8792	23
7 0	2 46.54	3.89	9.9999786	10	17 0	6 25.14	3.34	9.9998768	24
10	50.43	3.87	776	11	10	28.46	3.32	8745	23
20	54.30	3.88	765	10	20	31.76	3.30	8721	24
30	58.18	3.86	755	11	30	35.06	3.30	8697	24
40	3 2.04	3.86	744	11	40	38.34	3.28	8673	24
50	5.90	3.86	733	12	50	41.60	3.26	8649	24
8 0	3 9.76	3.85	9 9999721	12	18 0	6 44.86	3.26	9 9998624	25
10	13.61	3.84	709	11	10	48.10	3.24	8599	25
20	17.45	3.83	698	13	20	51.32	3.22	8574	25
30	21.28	3.83	685	12	30	54.53	3.21	8549	25
40	25.11	3.83	673	13	40	57.73	3.20	8524	25
50	28.93	3.82	660	12	50	7 0.92	3.19	8498	26
9 0	3 32.74	3.81	9.9999648	13	19 0	7 4.09	3.17	9.9998472	26
10	36.53	3.81	635	14	10	7.24	3.15	8446	26
20	40.33	3.80	621	13	20	10.38	3.14	8420	26
30	44.12	3.79	608	14	30	13.51	3.13	8394	26
40	47.91	3.79	594	14	40	16.62	3.11	8368	26
50	51.71	3.78	580	14	50	19.72	3.10	8341	27
10 0	9 55.47	3.76	9.9999566		20 0	7 22.80	3.08	9.9998314	27

Geogr. Breite	Geogr. Breite — Verb. Breite		log. Entfernung v. Centr.		Geogr. Breite	Geogr. Breite — Verb. Breite		log. Entfernung v. Centr.	
° ′	′ ″	″			°	′ ″	″		
20 0	7 22.80	3.07	9.9998314	27	30 0	9 57.12	2.00	9.9996392	37
10	25.87	3.06	8287	27	10	59.12	1.99	6355	36
20	28.93	3.03	8260	28	20	10 1.11	1.96	6319	37
30	31.96	3.03	8232	27	30	3.07	1.95	6282	37
40	34.99	3.03	8205	28	40	5.02	1.92	6245	37
50	37.99	3.00	8177	28	50	6.94	1.91	6208	37
21 0	7 40.99	3 00	9.9998149	28	31 0	10 8.85	1.88	9.9996171	37
10	43.96	2.97	8121	29	10	10.73	1.86	6134	38
20	46.92	2.96	8092	28	20	12.59	1.85	6096	37
30	49.87	2.95	8064	29	30	14.44	1.82	6059	38
40	52.80	2.93	8035	29	40	16.26	1.80	6021	37
50	55.71	2.91	8006	29	50	18.06	1.78	5984	38
22 0	7 58.61	2.90	9.9997977	29	32 0	10 19.84	1.76	9.9995946	38
10	8 1 49	2.88	7948	29	10	21.60	1.74	5908	38
20	4.36	2.87	7918	30	20	23.34	1.71	5870	38
30	7.21	2.85	7889	29	30	25.05	1.70	5832	38
40	10.04	2.83	7859	30	40	26.75	1.68	5794	38
50	12.86	2.82	7829	30	50	28.43	1.65	5755	39
23 0	8 15.66	2.80	9.9997799	30	33 0	10 30.08	1.63	9.9995717	38
10	18.44	2.78	7768	31	10	31.71	1.61	5678	39
20	21.21	2.77	7738	30	20	33.32	1.59	5640	38
30	23.96	2.75	7707	31	30	34.91	1 57	5601	39
40	26.69	2.73	7676	31	40	36.48	1.55	5562	39
50	29.41	2.72	7646	30	50	38.03	1.52	5523	39
24 0	8 32.10	2.69	9 9997614	32	34 0	10 39.55	1 51	9.9995484	39
10	34.79	2.69	7583	31	10	41.06	1.48	5445	39
20	37.45	2.66	7552	31	20	42.54	1.46	5406	39
30	40.10	2.65	7520	32	30	44.00	1.44	5367	39
40	42.73	2.63	7488	32	40	45.44	1.42	5327	40
50	45.34	2.61	7456	32	50	46.86	1.39	5288	39
25 0	8 47.93	2.59	9 9997424	32	35 0	10 48.25	1 38	9.9995248	40
10	50.51	2.58	7392	32	10	49.63	1.35	5208	40
20	53.06	2.55	7359	33	20	50.98	1.33	5169	39
30	55.61	2.55	7327	32	30	52.31	1.31	5129	40
40	58.13	2.52	7294	33	40	53.62	1.28	5089	40
50	9 0.63	2.50	7261	33	50	54.90	1.26	5049	40
26 0	9 3.12	2.49	9.9997228	33	36 0	10 56.16	1.25	9.9995009	40
10	5.59	2.47	7195	33	10	57.41	1.22	4969	40
20	8.04	2.45	7162	33	20	58.63	1.19	4929	41
30	10.47	2.43	7128	34	30	59.82	1.18	4888	40
40	12.88	2.41	7094	34	40	11 1.00	1.15	4848	41
50	15.27	2.39	7061	33	50	2.15	1.13	4807	40
27 0	9 17.65	2.38	9.9997027	34	37 0	11 3.28	1.11	9.9994767	41
10	20.00	2.35	6993	34	10	4.39	1.08	4726	40
20	22.34	2.34	6958	35	20	5.47	1.07	4686	41
30	24.66	2.32	6924	34	30	6 54	1.04	4645	41
40	26.96	2.30	6889	35	40	7.58	1.01	4604	41
50	29.24	2.28	6855	34	50	8.59	1.00	4563	41
28 0	9 31.50	2.26	9.9996820	35	38 0	11 9.59	0.97	9.9994522	41
10	33.74	2.24	6785	35	10	10.56	0.95	4481	41
20	35.97	2.23	6750	35	20	11.51	0.93	4440	41
30	38.17	2.20	6715	36	30	12.44	0.90	4399	41
40	40.36	2.19	6679	35	40	13.34	0.88	4358	41
50	42.52	2.16	6644	35	50	14.22	0.86	4317	41
29 0	9 44.66	2.14	9.9996608	36	39 0	11 15.08	0.84	9.9994276	41
10	46.79	2.13	6573	35	10	15.92	0.81	4234	42
20	48.90	2.11	6537	36	20	16.73	0.79	4193	41
30	50.98	2.08	6501	36	30	17.52	0.77	4152	41
40	53.05	2.07	6465	36	40	18.29	0.75	4110	42
50	55.09	2.04	6428	37	50	19.04	0.72	4069	41
30 0	9 57.12	2.03	9.9996392	36	40 0	11 19.76		9.9994027	42

Geogr. Breite	Geogr. Breite — Verb. Breite		log. Entfernung v. Centr.	
° ′	′ ″			
40 0	11 19.76	70	9.9994027	42
10	20.46	67	3985	41
20	21.13	66	3944	42
30	21.79	63	3902	42
40	22.42	60	3860	42
50	23.02	59	3819	41
41 0	11 23.61	56	9 9993777	42
10	24.17	53	3735	42
20	24.70	52	3693	42
30	25.22	49	3651	42
40	25.71	47	3609	42
50	26.18	44	3567	42
42 0	11 26.62	42	9.9993525	42
10	27.04	40	3483	42
20	27.44	38	3441	42
30	27.82	35	3399	42
40	28.17	33	3357	42
50	28.50	30	3315	42
43 0	11 28.80	38	9.9993273	43
10	29.08	26	3230	42
20	29.34	24	3188	42
30	29.58	21	3146	42
40	29.79	19	3104	42
50	29.98	16	3062	43
44 0	11 30.14	15	9.9993019	42
10	30.29	12	2977	42
20	30.41	9	2935	43
30	30.50	7	2892	42
40	30.57	5	2850	42
50	30.62	3	2808	42
45 0	11 30.65	0	9.9992766	43
10	30.65	2	2723	42
20	30.63	5	2681	42
30	30.58	7	2639	43
50	30.51	9	2596	42
50	30.42	11	2554	42
46 0	11 30.31	14	9.9992512	42
10	30.17	16	2470	43
20	30.01	19	2427	42
30	29.82	21	2385	42
40	29.61	23	2343	43
50	29.38	26	2300	42
47 0	11 29.12	27	9.9992258	42
10	28.85	31	2216	42
20	28.54	32	2174	42
30	28.22	35	2132	43
40	27.87	37	2089	42
50	27.50	40	2047	42
48 0	11 27.10	41	9.9992005	42
10	26.69	45	1963	42
20	26.24	46	1921	42
30	25.78	49	1879	42
40	25.29	51	1837	42
50	24.78	54	1795	42
49 0	11 24.24	55	9.9991753	42
10	23.69	58	1711	42
20	23.11	61	1669	42
30	22.50	63	1627	42
40	21.87	65	1586	41
50	21.22	67	1544	42
50 0	11 20.55		9.9991502	42

Geogr. Breite	Geogr. Breite — Verb. Breite		log. Entfernung v. Centr.	
° ″	′ ″			
50 0	11 20.55	70	9.9991502	42
10	19 85	72	1460	41
20	19.13	74	1419	42
30	18.39	76	1377	42
40	17.63	79	1335	41
50	16.84	82	1294	42
51 0	11 16.02	83	9.9991252	41
10	15.19	86	1211	41
20	14.33	88	1170	42
30	13.45	90	1128	41
40	12.55	93	1087	41
50	11.62	95	1046	41
52 0	11 10.67	97	9.9991005	42
10	9.70	99	0963	41
20	8.71	1.02	0922	41
30	7.69	1.03	0881	41
40	6.66	1.06	0840	40
50	5.60	1.09	0800	41
53 0	11 4.51	1.11	9.9990759	41
10	3.40	1.13	0718	41
20	2.27	1.15	0677	40
30	1.12	1.18	0637	41
40	10 59.94	1.20	0596	40
50	58.74	1.22	0556	41
54 0	10 57.52	1.24	9.9990515	40
10	56.28	1.26	0475	40
20	55.02	1.29	0435	40
30	53.73	1.31	0395	40
40	52 42	1.33	0355	40
50	51.09	1.35	0315	40
55 0	10 49.74	1.38	9 9990275	40
10	48.36	1.39	0235	40
20	46.97	1.42	0195	40
30	45.55	1.44	0155	39
40	44.11	1.46	0116	40
50	42.65	1.49	0076	39
56 0	10 41.16	1.51	9.9990037	39
10	39.65	1.52	89998	39
20	38.13	1.55	89958	39
30	36.58	1.57	89919	39
40	35.01	1.60	89880	39
50	33.41	1.61	89841	39
57 0	10 31.80	1.64	9.9989802	38
10	30.16	1.66	89764	39
20	28.50	1.67	89725	39
30	26.83	1.70	89686	38
40	25.13	1.73	89648	38
50	23.40	1.74	89610	39
58 0	10 21.66	1.76	9.9989571	38
10	19.90	1.79	89533	38
20	18.11	1.80	89495	38
30	16.31	1.83	89457	38
40	14.48	1.85	89419	37
50	12.63	1.86	89382	38
59 0	10 10.77	1.89	9.9989344	37
10	8.88	1.91	89307	38
20	6.97	1.93	89269	37
30	5.04	1.96	89232	37
40	3.08	1.97	89195	37
50	1.11	1.99	89158	37
60 0	9 59.12		9.9989121	

Geogr. Breite	Geogr. Breite — Verb. Breite		log. Entfernung v. Centr.		Geogr. Breite	Geogr. Breite — Verb. Breite		log. Entfernung v. Centr.	
60° 0′	9′ 59.12	2.01	9.9989121	37	70° 0′	7′ 25.08	3.09	9.9987174	27
10	57.11	2.03	89084	36	10	21.99	3.10	87147	27
20	53.08	2.06	89048	37	20	18.89	3.12	87120	27
30	51.02	2.07	89011	36	30	15.77	3.13	87093	27
40	50.95	2.09	88975	36	40	12.64	3.15	87066	26
50	48.86	2.12	88939	37	50	9.49	3.16	87040	27
61 0	9 46.74	2.13	9.9988902	36	71 0	7 6.33	3.18	9.9987013	26
10	44.61	2.15	88866	35	10	3.15	3.19	86987	26
20	42.46	2.18	88831	36	20	6 59.96	3.20	86961	25
30	40.28	2.19	88795	36	30	56.76	3.22	86936	26
40	38.09	2.21	88759	35	40	53.54	3.24	86910	25
50	35.88	2.23	88724	36	50	50.30	3.24	86885	26
62 0	9 33.65	2.25	9.9988688	35	72 0	6 47.06	3.27	9.9986859	24
10	31.40	2.28	88653	35	10	43.79	3.27	86835	25
20	29.12	2.29	88618	35	20	40.52	3.29	86810	25
30	26.83	2.31	88583	35	30	37.23	3.30	86785	24
40	24.52	2.32	88548	34	40	33.93	3.32	86761	24
50	22.20	2.35	88514	35	50	30.61	3.32	86737	24
63 0	9 19.85	2.37	9.9988479	34	73 0	6 27.28	3.33	9.9986713	24
10	17.48	2.39	88445	34	10	23.94	3.34	86689	24
20	15.09	2.40	88411	34	20	20.58	3.36	86665	23
30	12.69	2.42	88377	34	30	17.21	3.37	86642	23
40	10.27	2.45	88343	34	40	13.83	3.38	86619	23
50	7.82	2.46	88309	34	50	10.44	3.39	86596	23
64 0	9 5.36	2.48	9.9988275	33	74 0	6 7.03	3.41	9.9986573	22
10	2.88	2.50	88242	33	10	3.61	3.42	86551	22
20	0.38	2.51	88209	33	20	0.18	3.43	86529	23
30	8 57.87	2.54	88176	33	30	5 56.73	3.45	86506	21
40	55.33	2.55	88143	33	40	53.28	3.45	86485	22
50	52.78	2.57	88110	33	50	49.81	3.47	86463	22
65 0	8 50.21	2.59	9.9988077	33	75 0	5 46.33	3.48	9.9986441	21
10	47.62	2.61	88044	32	10	42.84	3.49	86420	21
20	45.01	2.62	88012	32	20	39.33	3.51	86399	21
30	42.39	2.65	87980	32	30	35.82	3.51	86378	20
40	39.74	2.66	87948	32	40	32.29	3.53	86358	20
50	37.08	2.68	87916	32	50	28.75	3.54	86338	21
66 0	8 34.40	2.69	9.9987884	31	76 0	5 25.20	3.55	9.9986317	20
10	31.71	2.72	87853	32	10	21.64	3.56	86297	19
20	28.99	2.73	87821	31	20	18.07	3.57	86278	20
30	26.26	2.74	87790	31	30	14.49	3.58	86258	19
40	23.52	2.77	87759	31	40	10.89	3.60	86239	19
50	20.75	2.78	87728	31	50	7.29	3.60	86220	19
67 0	8 17.97	2.80	9.9987697	30	77 0	5 3.67	3.62	9.9986201	18
10	15.17	2.82	87667	30	10	0.05	3.62	86183	19
20	12.35	2.83	87636	31	20	4 56.41	3.64	86164	18
30	9.52	2.85	87606	30	30	52.77	3.64	86146	18
40	6.67	2.86	87576	30	40	49.11	3.66	86128	18
50	3.81	2.89	87546	30	50	45.45	3.66	86110	17
68 0	8 0.92	2.90	9.9987517	29	78 0	4 41.77	3.68	9.9986093	17
10	7 58 02	2.91	87487	30	10	38.09	3.68	86076	17
20	55.11	2.93	87458	29	20	34.40	3.69	86059	17
30	52.18	2.95	87429	29	30	30.69	3.71	86042	17
40	49.23	2.96	87400	29	40	26.98	3.71	86025	16
50	46.27	2.98	87371	29	50	23.26	3.72	86009	16
69 0	7 43.29	3.00	9.9987342	28	79 0	4 19.53	3.73	9.9985993	16
10	40.29	3.01	87314	28	10	15.79	3.74	85977	16
20	37.28	3.03	87286	29	20	12.04	3.75	85961	15
30	34.25	3.04	87257	27	30	8.29	3.76	85946	15
40	31.21	3.06	87230	28	40	4.53	3.76	85931	15
50	28.15	3.07	87202	28	50	0.77	3.78	85916	15
70 0	7 25.08		9.9987174		80 0	3 96.96	3.78	9.9985901	

Geogr. Breite	Geogr. Breite — Verb. Breite		log. Entfernung v. Centr.	
80° 0′	3′ 56″.96		9.9985901	
10	53.17	3.79	85886	15
20	49 37	3.80	85872	14
30	45.57	3.80	85858	14
40	41.75	3.82	85844	14
50	37.93	3.82	85831	13
		3.83		13
81 0	3 34.10	3.83	9.9985818	
10	30.27	3.85	85804	14
20	26.42	3.85	85792	12
30	22.57	3.85	85779	13
40	18.72	3.87	85767	12
50	14.85	3.87	85755	12
82 0	3 10.98	3.87	9.9985743	12
10	7.11	3.89	85731	12
20	3.22	3.89	85720	11
30	2 59.33	3.89	85708	12
40	55.44	3.90	85697	11
50	51.54	3.91	85687	10
83 0	2 47.63	3.92	9.9985676	11
10	43.71	3.91	85666	10
20	39.80	3.93	85656	10
30	35.87	3.93	85646	10
40	31.94	3.93	85637	9
50	28.01	3.94	85628	9
84 0	2 24.07	3.95	9.9985619	9
10	20.12	3.95	85610	9
20	16.17	3.95	85601	9
30	12.22	3.96	85593	8
40	8.26	3.97	85585	8
50	4.29	3.96	85577	8
85 0	2 0.33	3.98	9.9985570	7
10	1 56.35	3.97	85562	8
20	52.38	3.98	85555	7
30	48.40	3.98	85549	6
40	44.42	3.99	85542	7
50	40.43	3.99	85536	6
86 0	1 36.44	3.99	9.9985530	6
10	32.45	4.00	85524	6
20	28.45	4.00	85518	5
30	24.45	4.00	85513	5
40	20.45	4.01	85508	5
50	16.44	4.01	85503	5
87 0	1 12.43	4.01	9.9985498	4
10	8.42	4.01	85494	4
20	4.41	4.01	85490	4
30	0.40	4.02	85486	4
40	0 56.38	4.02	85483	3
50	52.36	4.02	85479	4
88 0	0 48.34	4.02	9.9985476	3
10	44.32	4.03	85473	3
20	40.29	4.02	85471	2
30	36.27	4.03	85468	3
40	32.24	4.03	85466	2
50	28.21	4.03	85464	2
89 0	0 24.18	4.03	9.9985463	1
10	20.15	4.03	85461	2
20	16.12	4.03	85460	1
30	12.09	4.03	85459	1
40	8.06	4.03	85458	1
50	4.03	4.03		0
90 0	0 0.00		9.9985458	

	φ'	log. ϱ'	lg. $\pi\varrho\cos.\varphi'$	lg. $\pi\varrho\sin.\varphi'$	log. tang. φ'	δ.
	° ′ ″					
Åbo	+60 17 3	9.99890	0.64594	0.88949	0.24355	− 5ˢ841
Albany	+42 28 21	9.99934	0.81898	0.78062	9.96163	+57.259
Altona	+53 21 45	9.99906	0.72667	0.85529	0.12861	+ 2.269
Ann Arbor	+42 5 21	9.99935	0.82163	0.77743	9.95580	+63.820
Armagh	+54 10 18	9.99904	0.71828	0.85976	0.14148	+13.170
Athen	+37 47 11	9.99945	0.84906	0.73853	9.88947	− 6.792
Batavia	− 6 5 11	9.99998	0.94935	9.97722$_n$	9.02787^n	−61.377
Berlin	+52 19 9	9.99909	0.73714	0.84932	0.11218	0.000
Bern	+46 45 37	9.99923	0.78677	0.81348	0.02670	+ 3.913
Bilk	+51 1 10	9.99912	0.74963	0.84156	0.09193	+ 4.353
Bologna	+44 18 17	9.99929	0.80580	0.79526	9.98946	+ 1.342
Bonn	+50 32 28	9.99913	0.75408	0.83861	0.08453	+ 4.137
Breslau	+50 55 41	9.99912	0.75048	0.84100	0.09052	− 2.393
Brüssel	+50 39 54	9.99913	0.75294	0.83938	0.08645	+ 5.932
Cambridge (Engl.)	+52 1 42	9.99910	0.73999	0.84762	0.10763	+ 8.740
Cambridge (Mass.)	+42 11 21	9.99934	0.82094	0.77826	9.95732	+55.540
Christiania	+59 44 44	9.99891	0.65302	0.88714	0.23412	+ 1.754
Clinton	+42 51 48	9.99933	0.81624	0.78382	9.96758	+58.351
Danzig	+54 10 23	9.99904	0.71827	0.85977	0.14150	− 3.462
Dorpat	+58 12 30	9.99895	0.67244	0.88017	0.20773	− 8.757
Dublin	+53 12 11	9.99907	0.72830	0.85439	0.12609	+12.969
Durham	+54 35 15	9.99903	0.71387	0.86201	0.14814	+ 9.842
Edinburg	+55 46 42	9.99901	0.70087	0.86827	0.16739	+10.893
Florenz	+43 34 34	9.99931	0.81114	0.78955	9.97841	+ 1.406
Genf	+46 0 29	9.99925	0.79278	0.80806	0.01529	+ 4.758
Glasgow	+55 42 0	9.99901	0.70174	0.86786	0.16612	+11.627
Gotha (Neue Sternw.)	+50 45 21	9.99913	0.75210	0.83995	0.08785	+ 1.764
Göttingen	+51 20 35	9.99911	0.74657	0.84353	0.09695	+ 2.269
Greenwich	+51 17 24	9.99911	0.74707	0.84320	0.09613	+ 8.802
Hamburg	+53 22 6	9.99906	0.72661	0.85532	0.12871	+ 2.248
Helsingfors	+59 59 45	9.99891	0.64975	0.88824	0.23849	− 7.600
Kasan	+55 36 41	9.99901	0.70273	0.86740	0.16468	−23.475
Königsberg	+54 31 59	9.99903	0.71445	0.86171	0.14726	− 4.665
Kopenhagen	+55 30 30	9.99901	0.70387	0.86687	0.16300	+ 0.536
Krakau	+49 52 30	9.99915	0.76016	0.83443	0.07426	− 4.314
Kremsmünster	+47 51 57	9.99920	0.77766	0.82118	0.04352	− 0.485
Leiden	+51 58 11	9.99910	0.74056	0.84727	0.10672	+ 5.856
Leipzig	+51 8 52	9.99912	0.74842	0.84235	0.09392	+ 0.660
Liverpool	+53 13 46	9.99907	0.72804	0.85454	0.12651	+10.774
London (Mr. Bishop)	+51 15 57	9.99911	0.74730	0.84306	0.09575	+ 9.003
London (Mr. Barclay)	+51 23 21	9.99911	0.74613	0.84380	0.09767	+ 8.804

	φ'	log. ϱ'	lg. $\pi\varrho\cos.\varphi'$	lg. $\pi\varrho\sin.\varphi'$	log. tang. φ'	s.
	° ′ ″					
Lübeck	+53 40 33	9.99906	0.72346	0.85704	0.13358	+ 1s778
Lund	+55 31 10	9.99901	0.70374	0.86693	0.16318	+ 0.134
Madras	+12 59 5	9.99993	0.94050	0.30334	9.36284	−43.923
Madrid	+40 13 8	9.99939	0.83407	0.76125	9.92718	+11.226
Mailand	+45 16 30	9.99927	0.79848	0.80265	0.00417	+ 2.762
Mannheim	+49 17 50	9.99916	0.76532	0.83071	0.06539	+ 3.242
Marburg	+50 37 30	9.99913	0.75331	0.83914	0.08583	+ 3.039
Marseille	+43 6 20	9.99932	0.81452	0.78578	9.97126	+ 5.275
Melbourne	−37 38 45	9.99946	0.84990	0.73716$_n$	9.88727$_n$	−86.461
Modena	+44 27 22	9.99929	0.80468	0.79643	9.99175	+ 1.621
Moskau	+55 34 37	9.99901	0.70311	0.86722	0.16412	−15.885
München	+47 57 18	9.99920	0.77691	0.82179	0.04488	+ 1.175
Neapel	+40 40 24	9.99938	0.83112	0.76528	9.93416	− 0.558
Neuchâtel	+46 48 32	9.99923	0.78638	0.81382	0.02744	+ 4. 30
New-York	+40 41 22	9.99938	0.83102	0.76542	9.93441	+57.416
Nicolajeff	+46 46 51	9.99923	0.78661	0.81362	0.02701	−12.209
Olmütz	+49 24 21	9.99916	0.76436	0.83141	0.06706	− 2.554
Oxford	+51 34 24	9.99911	0.74438	0.84492	0.10054	+ 9.631
Padua	+45 12 32	9.99927	0.79899	0.80215	0.00317	+ 1.002
Palermo	+37 55 34	9.99945	0.84824	0.73989	9.89166	+ 0.030
Paramatta	−33 38 12	9.99955	0.87179	0.69482$_n$	9.82303$_n$	−90.437
Paris	+48 38 48	9.99918	0.77100	0.82644	0.05543	+ 7.266
Petersburg	+59 46 30	9.99891	0.65264	0.88727	0.23463	−11.112
Philadelphia	+39 45 48	9.99940	0.83697	0.75714	9.92017	+58.190
Prag	+49 53 58	9.99915	0.75994	0.83458	0.07464	− 0.675
Pulkowa	+59 36 17	9.99892	0.65486	0.88653	0.23167	−11.126
Rom	+41 42 27	9.99936	0.82424	0.77422	9.94998	+ 0.599
Santiago de Chile	−33 15 51	9.99956	0.87366	0.69056$_n$	9.81689$_n$	+55.218
Speyer	+49 7 32	9.99917	0.76684	0.82960	0.06276	+ 3.255
Stockholm	+59 10 27	9.99893	0.66038	0.88461	0.22422	− 3.065
Sydney	−33 41 3	9.99955	0.87155	0.69536$_n$	9.82381$_n$	−90.584
Turin	+44 52 35	9.99928	0.80152	0.79965	9.99813	+ 3.741
Upsala (Neue Sternw.)	+59 41 31	9.99892	0.65373	0.88691	0.23318	− 2.779
Utrecht	+51 54 0	9.99910	0.74123	0.84686	0.10563	+ 5.429
Venedig	+45 14 19	9.99927	0.79876	0.80238	0.00362	+ 0.685
Vorgb. d. g. H.	−33 45 24	9.99955	0.87118	0.69618$_n$	9.82500$_n$	− 3.341
Warschau	+52 1 56	9.99910	0.73995	0.84764	0.10769	− 5.017
Washington	+38 42 24	9.99943	0.84354	0.74736	9.90382	+59.431
Wien	+48 1 9	9.99920	0.77637	0.82222	0.04585	− 1.961
Wien (Oppolzer)	+48 1 28	9.99920	0.77633	0.82226	0.04594	− 1.944
Wilna	+54 30 8	9.99904	0.71479	0.86156	0.14677	− 7.822

m.

"	0′	1′	2′	3′	4′	5′	6′	7′
0	0″00	1″96	7″85	17″67	31″42	49″09	70″68	96″20
1	0.00	2.03	7.98	17.87	31.68	49.41	71.07	96.66
2	0.00	2.10	8.12	18.07	31.94	49.74	71.47	97.12
3	0.00	2.16	8.25	18.27	32.20	50.07	71.86	97.58
4	0.01	2.23	8.40	18.47	32.47	50.40	72.26	98.04
5	0.01	2.31	8.52	18.67	32.74	50.73	72.66	98.50
6	0.02	2.38	8.66	18.87	33.01	51.07	73.06	98.97
7	0.02	2.45	8.80	19.07	33.27	51.40	73.46	99.43
8	0.03	2.52	8.94	19.28	33.54	51.74	73.86	99.90
9	0.04	2.60	9.08	19.48	33.81	52.07	74.26	100.37
10	0.05	2.67	9.22	19.70	34.09	52.41	74.66	100.84
11	0.06	2.75	9.36	19.90	34.36	52.75	75.06	101.31
12	0.08	2.83	9.50	20.11	34.64	53.09	75.47	101.78
13	0.09	2.91	9.64	20.32	34.91	53.43	75.88	102.25
14	0.11	2.99	9.80	20.53	35.19	53.77	76.29	102.72
15	0.12	3.07	9.94	20.74	35.46	54.11	76.69	103.20
16	0.14	3.15	10.09	20.95	35.74	54.46	77.10	103.67
17	0.16	3.23	10.24	21.16	36.02	54.80	77.51	104.15
18	0.18	3.32	10.39	21.38	36.30	55.15	77.93	104.63
19	0.20	3.40	10.54	21.60	36.58	55.50	78.34	105.10
20	0.22	3.49	10.69	21.82	36.87	55.84	78.75	105.58
21	0.24	3.58	10.84	22.03	37.15	56.19	79.16	106.06
22	0.26	3.67	11.00	22.25	37.44	56.55	79.58	106.55
23	0.28	3.76	11.15	22.47	37.72	56.90	80.00	107.03
24	0.31	3.85	11.31	22.70	38.01	57.25	80.42	107.51
25	0.34	3.94	11.47	22.92	38.30	57.60	80.84	107.99
26	0.37	4.03	11.63	23.14	38.60	57.96	81.26	108.48
27	0.40	4.12	11.80	23.37	38.88	58.32	81.68	108.97
28	0.43	4.22	11.95	23.60	39.17	58.68	82.10	108.46
29	0.46	4.32	12.11	23.81	39.46	59.03	82.52	109.95
30	0.49	4.42	12.27	24.05	39.76	59.39	82.95	110.44

n.

0″	0″00	0″00	0″00	0″00	0″00	0″01	0″01	0″02
10	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02
20	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.03
30	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03

m.

	0′	1′	2′	3′	4′	5′	6′	7′
″								
30	0″49	4″42	12″27	24″05	39″76	59″40	82″95	110″44
31	0.52	4.52	12.43	24.28	40.05	59.75	83.38	110.93
32	0.56	4.62	12.60	24.51	40.35	60.11	83.81	111.43
33	0.59	4.72	12.76	24.74	40.65	60.47	84.23	111.92
34	0.63	4.82	12.93	24.98	40.95	60.84	84.66	112.41
35	0.67	4.92	13.10	25.21	41.25	61.20	85.09	112.90
36	0.71	5.03	13.27	25.45	41.55	61.57	85.52	113.40
37	0.75	5.13	13.44	25.68	41.85	61.94	85.95	113.90
38	0.80	5.24	13.62	25.92	42.15	62.31	86.40	114.40
39	0.83	5.34	13.80	26.16	42.45	62.68	86.82	114.90
40	0.87	5.45	13.96	26.40	52.76	63.05	87.26	115.40
41	0.91	5.56	14.13	26.64	43.06	63.42	87.70	115.90
42	0.96	5.67	14.31	26.88	43.37	63.79	88.14	116.40
43	1.01	5.78	14.49	27.12	43.68	64.16	88.57	116.90
44	1.06	5.90	14.67	27.37	43.99	64.54	89.01	117.41
45	1.10	6.01	14.85	27.61	44.30	64.91	89.45	117.92
46	1.15	6.13	15.03	27.86	44.61	65.29	89.89	118.43
47	1.20	6.24	15.21	28.10	44.92	65.67	90.33	118.94
48	1.26	6.36	15.39	28.35	45.24	66.05	90.78	119.45
49	1.31	6.48	15.57	28.60	45.55	66.43	91.23	119.96
50	1.36	6.60	15.76	28.85	45.87	66.81	91.68	120.47
51	1.42	6.72	15.95	29.12	46.18	67.19	92.12	120.98
52	1.48	6.84	16.14	29.36	46.50	67.58	92.57	121.49
53	1.53	6.96	16.32	29.61	46.82	67.96	93.02	122.01
54	1.59	7.09	16.51	29.86	47.14	68.35	93.47	122.53
55	1.65	7.21	16.70	30.12	47.46	68.73	93.92	123.05
56	1.71	7.34	16.89	30.38	47.80	69.12	94.38	123.57
57	1.77	7.46	17.08	30.64	48.11	69.51	94.83	124.09
58	1.83	7.60	17.28	30.90	48.43	69.90	95.29	124.61
59	1.89	7.72	17.47	31.16	48.76	70.29	95.74	125.13
60	1.96	7.85	17.67	31.42	49.09	70.68	96.20	125.65

n.

30″	0″00	0″00	0″00	0″00	0″00	0″01	0″02	0″03
40	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03
50	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.04
60	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.04

m.

″	8′	9′	10′	11′	12′	13′	14′
0	125″65	159″02	196″32	237″54	282″68	331″74	384″74
1	126.17	159.61	196.97	238.26	283.47	332.59	385.65
2	126.70	160.20	197.63	238.98	284.26	333.44	386.56
3	127.22	160.80	198.28	239.70	285.04	334.19	387.48
4	127.75	161.39	198.94	240.42	285.83	335.15	388.40
5	128.28	161.98	199.60	241.14	286.62	336.00	389.32
6	128.81	162.58	200.26	241.87	287.41	336.86	390.24
7	129.34	163.17	200.92	242.60	288.20	337.72	391.16
8	129.87	163.77	201.60	243.33	289.00	338.58	392.09
9	130.40	164.37	202.25	244.06	289.78	339.44	393.01
10	130.94	164.97	202.92	244.79	290.58	340.30	393.94
11	131.47	165.57	203.58	245.52	291.38	341.16	394.86
12	132.01	166.17	204.25	246.25	292.38	342.02	395.79
13	132.55	166.77	204.92	246.98	292.98	342.88	396.72
14	133.09	167.37	205.59	247.72	293.78	343.75	397.65
15	133.63	167.97	206.26	248.45	294.58	344.62	398.58
16	134.17	168.58	206.93	249.19	295.38	345.49	399.52
17	134.71	169.19	207.60	249.93	296.18	346.36	400.45
18	135.25	169.80	208.27	250.67	296.99	347.23	401.38
19	135.80	170.41	209.94	251.41	297.79	348.10	402.32
20	136.34	171.02	209.62	252.15	298.60	348.97	403.26
21	136.88	171.63	210.30	252.89	299.40	349.84	404.20
22	137.43	172.24	210.98	253.63	300.21	350.71	405.14
23	137.98	172.85	211.66	254.37	301.02	351.58	406.08
24	138.53	173.47	212.34	255.12	301.83	352.46	407.02
25	139.08	174.08	213.02	255.87	302.64	353.34	407.96
26	139.63	174.70	213.70	256.62	303.46	354.22	408.90
27	140.18	175.32	214.38	257.37	304.27	355.10	409.84
28	140.74	175.94	215.07	258.12	305.09	355.98	410.79
29	141.29	176.56	215.75	258.87	305.90	356.86	411.73
30	141.85	177.18	216.44	259.62	306.72	357.74	412.68

n.

0″	0″04	0″06	0″09	0″14	0″19	0″27	0″36
10	0.04	0.07	0.10	0.15	0.20	0.28	0.38
20	0.05	0.07	0.11	0.15	0.22	0.30	0.39
30	0.05	0.08	0.11	0.16	0.23	0.31	0.41

LIBRARY

III.

"	8′	9′	10′	11′	12′	13′	14′
30	141"85	177"18	216"44	259"62	306"72	357"74	412"68
31	142.40	177.80	217.12	260.37	307.54	358.62	413.63
32	142.96	178.43	217.81	261.12	308.36	359.51	414.59
33	143.52	179.05	218.50	261.88	309.18	360.39	415.54
34	144.08	179.68	219.19	262.64	310.00	361.28	416.49
35	144.64	180.30	219.88	263.39	310.82	362.17	417.44
36	145.20	180.93	220.58	264.15	311.65	363.07	418.40
37	145.76	181.56	221.27	264.91	312.47	363.96	419.35
38	146.33	182.19	221.97	265.68	313.30	364.85	420.31
39	146.89	182.82	222.66	266.44	314.12	365.75	421.27
40	147.46	183.46	223.36	267.20	314.95	366.64	422.23
41	148.03	184.09	224.06	267.96	315.78	367.53	423.19
42	148.60	184.72	224.76	268.73	316.61	368.42	424.15
43	149.17	185.35	225.46	269.49	317.44	369.31	425.11
44	149.74	185.99	226.16	270.26	318.27	370.21	426.07
45	150.31	186.63	226.86	271.02	319.10	371.11	427.04
46	150.88	187.27	227.57	271.79	319.94	372.01	428.01
47	151.45	187.91	228.27	272.56	320.78	372.91	428.97
48	152.03	188.55	228.98	273.34	321.62	373.82	429.93
49	152.61	189.19	229.68	274.11	322.45	374.72	430.90
50	153.19	189.83	230.39	274.88	323.29	375.62	431.87
51	153.77	190.47	231.10	275.65	324.13	376.52	432.84
52	154.35	191.12	231.81	276.43	324.97	377.43	433.82
53	154.93	191.76	232.52	277.20	325.81	378.34	434.79
54	155.51	192.41	233.24	277.98	326.66	379.26	435.76
55	156.09	193.06	233.95	278.76	327.50	380.17	436.73
56	156.67	193.71	234.67	279.55	328.35	381.08	437.71
57	157.25	194.36	235.38	280.33	329.19	381.99	438.69
58	157.84	195.01	236.10	281.12	330.04	382.90	439.67
59	158.43	195.66	236.82	281.90	330.90	383.82	440.65
60	159.02	196.32	237.54	282.68	331.74	384.74	441.63

IV.

30"	0"05	0"08	0"11	0"16	0"23	0"31	0"41
40	0.05	0.08	0.12	0.17	0.24	0.33	0.43
50	0.06	0.09	0.13	0.18	0.25	0.34	0.45
60	0.06	0.09	0.14	0.19	0.26	0.36	0.47

m.

″	15′	16′	17′	18′	19′	20′	21′
0	441.6	502.5	567.2	635.9	708.4	784.9	865.3
1	442.6	503.5	568.3	637.0	709.7	786.2	866.6
2	443.6	504.6	569.4	638.2	710.9	787.5	868.0
3	444.6	505.6	570.5	639.4	712.1	788.8	869.4
4	445.6	506.7	571.6	640.6	713.4	790.1	870.8
5	446.5	507.7	572.8	641.7	714.6	791.4	872.1
6	447.5	508.8	573.9	642.9	715.9	792.7	873.5
7	448.5	509.8	575.0	644.1	717.1	794.0	874.9
8	449.5	510.9	576.1	645.3	718.4	795.4	876.3
9	450.5	511.9	577.2	646.5	719.6	796.7	877.6
10	451.5	513.0	578.4	647.7	720.9	798.0	879.0
11	452.5	514.0	579.5	648.9	722.1	799.3	880.4
12	453.5	515.1	580.6	650.0	723.4	800.7	881.8
13	454.5	516.1	581.7	651.2	724.6	802.0	883.2
14	455.5	517.2	582.9	652.4	725.9	803.3	884.6
15	456.5	518.3	584.0	653.6	727.2	804.6	886.0
16	457.5	519.3	585.1	654.8	728.4	806.0	887.4
17	458.5	520.4	586.2	656.0	729.7	807.3	888.8
18	459.5	521.5	587.4	657.2	730.9	808.6	890.2
19	460.5	522.5	588.5	658.4	732.2	809.9	891.6
20	461.5	523.6	589.6	659.6	733.5	811.3	893.0
21	462.5	524.6	590.8	660.8	734.7	812.6	894.4
22	463.5	525.7	591.9	662.0	736.0	813.9	895.8
23	464.5	526.8	593.0	663.2	737.3	815.2	897.2
24	465.5	527.9	594.2	664.4	738.5	816.6	898.6
25	466.5	528.9	595.2	665.6	739.8	817.9	900.0
26	467.5	530.0	596.5	666.8	741.1	819.2	901.4
27	468.5	531.1	597.6	668.0	742.3	820.5	902.8
28	469.5	532.2	598.7	669.2	743.6	821.9	904.2
29	470.5	533.2	599.9	670.4	744.9	823.2	905.6
30	471.5	534.3	601.0	671.6	746.2	824.6	907.0

n.

0″	0″47	0″61	0″78	0″98	1″22	1″49	1″82
10	0.49	0.64	0.81	1.02	1.26	1.54	1.87
20	0.52	0.67	0.84	1.06	1.30	1.60	1.93
30	0.54	0.69	0.88	1.09	1.35	1.65	1.99

III.

"	15′	16′	17′	18′	19′	20′	21′
30	471"5	534"3	601"0	671"6	746"2	824"6	907"0
31	472.6	535.4	602.2	672.8	747.4	825.9	908.4
32	473.6	536.5	603.3	674.1	748.7	827.3	909.8
33	474.6	537.6	604.5	675.3	750.0	828.6	911.2
34	475.6	538.7	605.6	676.5	751.3	829.9	912.6
35	476.6	539.7	606.8	677.7	752.6	831.2	914.0
36	477.6	540.8	607.9	678.9	753.8	832.6	915.5
37	478.7	541.9	609.1	680.1	755.1	833.9	916.9
38	479.7	543.0	610.2	681.3	756.4	835.3	918.3
39	480.7	544.1	611.4	682.6	757.7	836.6	919.7
40	481.7	545.2	612.5	683.8	759.0	838.0	921.1
41	482.8	546.3	613.7	685.0	760.2	839.3	922,5
42	483.8	547.4	614.8	686.2	761.5	840.7	923,9
43	484.8	548.4	616.0	687.4	762.8	842.0	925,3
44	485.8	549.5	617.2	688.7	764.1	843.4	926,8
45	486.9	550.6	618.3	689.9	765.4	844.7	928.2
46	487.9	551.7	619.5	691.1	766.7	846.1	929,6
47	488.9	552.8	620.6	692.4	768.0	847.5	931.0
48	490.0	553.9	621.8	693.6	769.3	848,9	932,4
49	491.0	555.0	623.0	694.8	770.6	850.2	933.8
50	492.0	556.1	624.1	696.0	771.9	851.6	935.2
51	493.1	557.2	625.3	697.3	773.1	852.9	936,6
52	494.1	558.3	626.5	698.5	774.5	854,3	938.1
53	495.2	559.4	627.6	699.7	775.8	855.6	939.5
54	496.2	560.5	628,8	701.0	777.1	857.1	940.9
55	497.2	561.6	630.0	702.2	778.4	858.4	942.3
56	498.3	562.7	631.2	703.5	779.7	859.8	943.8
57	499.3	563.9	632.3	704.7	781.0	861.1	945.2
58	500.3	565.0	633.5	705.9	782.3	862.5	946.6
59	501.4	566.1	634.7	707.1	783.6	863.9	948.1
60	502.5	567.2	635.9	708.3	784.9	865.3	949.6

IV.

30"	0"54	0"69	0"88	1"09	1"35	1"65	1"99
40	0.56	0.72	0.91	1.13	1.40	1.70	2.06
50	0.59	0.75	0,95	1.18	1.44	1.76	2.12
60	0.61	0.78	0,98	1.22	1.49	1.82	2.19

m.

″	22′	23′	24′	25′	26′	27′	28′
0	949″6	1037″8	1129″9	1225″9	1325″9	1429″7	1537″5
1	951.0	1039.3	1131.4	1227.5	1327.6	1431.4	1539.3
2	952.4	1040.8	1133.0	1229.2	1329.3	1433.2	1541.1
3	953.8	1042.3	1134.6	1230.8	1331.0	1434.9	1542.9
4	955.3	1043.8	1136.2	1232.5	1332.7	1436.7	1544.8
5	956.7	1045.3	1137.8	1234.1	1334.4	1438.5	1546.6
6	958.2	1046.8	1139.3	1235.7	1336.1	1440.3	1548.4
7	959.6	1048.3	1140.9	1237.3	1337.8	1442.1	1550.2
8	961.1	1049.8	1142.5	1239.0	1339.5	1443.9	1552.1
9	962.5	1051.3	1144.0	1240.6	1341.2	1445.6	1553.9
10	963.9	1952.8	1145.6	1242.3	1342.9	1447.4	1555.8
11	965.4	1054.3	1147.2	1243.9	1344.6	1449.2	1557.6
12	966.9	1055.9	1148.8	1245.6	1346.3	1451.0	1559.5
13	968.3	1057.4	1150.4	1247.2	1348.0	1452.8	1561.3
14	969.8	1058.9	1152.0	1248.9	1349.7	1454.5	1563.2
15	971.2	1060.4	1153.6	1250.5	1351.4	1456.3	1565.0
16	972.7	1062.0	1155.2	1252.2	1353.2	1458.1	1566.9
17	974.1	1063.5	1156.8	1253.8	1354.9	1459.9	1568.7
18	975.5	1065.0	1158.3	1255.5	1356.6	1461.6	1570.5
19	977.0	1066.5	1159.9	1257.1	1358.3	1463.4	1572.4
20	978.5	1068.1	1161.5	1258.8	1360.1	1465.2	1574.3
21	979.9	1069.6	1163.1	1260.4	1361.8	1466.9	1576.1
22	981.4	1071.1	1164.7	1262.1	1363.5	1468.7	1578.0
23	982.9	1072.6	1166.3	1263.7	1365.2	1470.5	1579.8
24	984.4	1074.2	1167.9	1265.4	1367.0	1472.3	1581.7
25	985.8	1075.7	1169.5	1267.0	1368.7	1474.0	1583.5
26	987.3	1077.2	1171.1	1268.7	1370.4	1475.9	1585.3
27	988.8	1078.7	1172.7	1270.3	1372.1	1477.7	1587.2
28	990.3	1080.3	1174.3	1272.1	1373.9	1479.5	1589.1
29	991.8	1081.8	1175.9	1273.7	1375.6	1481.3	1590.9
30	993.2	1083.3	1177.5	1275.4	1377.4	1483.1	1592.7

n.

0″	2″19	2″61	3″10	3″64	4″26	4″96	5″73
10	2.25	2.69	3.18	3.74	4.37	5.08	5.87
20	2.32	2.77	3.27	3.84	4.48	5.20	6.01
30	2.39	2.85	3.36	3.94	4.60	5.33	6.15

m.

″	22′	23′	24′	25′	26′	27′	28′
30	993″2	1083″3	1177″5	1275″4	1377″4	1483″1	1592″7
31	994.7	1084.8	1179.1	1277.1	1379.0	1484.9	1594.6
32	996.2	1086.4	1180.7	1278.8	1380.8	1486.7	1596.5
33	997.6	1087.9	1182.3	1280.4	1382.5	1488.5	1598.3
34	999.1	1089.5	1183.9	1282.1	1384.2	1490.3	1600.2
35	1000.6	1091.0	1185.5	1283.8	1385.9	1492.1	1602.1
36	1002.1	1092.6	1187.1	1285.5	1387.7	1493.9	1604.0
37	1003.5	1094.1	1188.7	1287.1	1389.4	1495.7	1605.9
38	1005.0	1095.7	1190.3	1288.8	1391.2	1497.5	1607.7
39	1006.5	1097.2	1191.9	1290.5	1392.9	1499.3	1609.6
40	1008.0	1098.8	1193.5	1292.2	1394.7	1501.1	1611.5
41	1009.4	1100.3	1195.1	1293.8	1396.4	1502.9	1613.3
42	1010.9	1101.9	1196.7	1295.5	1398.2	1504.7	1615.2
43	1012.4	1103.4	1198.3	1297.2	1399.9	1506.5	1617.1
44	1013.9	1105.0	1199.9	1298.9	1401.7	1508.4	1619.0
45	1015.4	1106.5	1201.5	1300.5	1403.4	1510.2	1620.8
46	1016.9	1108.1	1203.1	1302.2	1405.2	1512.0	1622.7
47	1018.4	1109.6	1204.7	1303.9	1406.9	1513.8	1624.6
48	1019.9	1111.2	1206.4	1305.6	1408.7	1515.6	1626.5
49	1021.4	1112.7	1208.0	1307.3	1410.4	1517.4	1628.3
50	1022.8	1114.3	1209.6	1309.0	1412.2	1519.2	1630.2
51	1024.3	1115.8	1211.2	1310.7	1413.9	1521.0	1632.1
52	1025.8	1117.4	1212.9	1312.4	1415.7	1522.9	1634.0
53	1027.3	1118.9	1214.5	1314.1	1417.4	1524.7	1635.9
54	1028.8	1120.5	1216.1	1315.7	1419.2	1526.5	1637.7
55	1030.3	1122.0	1217.7	1317.4	1420.9	1528.3	1639.6
56	1031.8	1123.6	1219.4	1319.1	1422.7	1530.2	1641.5
57	1033.3	1125.1	1221.0	1320.8	1424.4	1532.0	1643.3
58	1034.8	1126.7	1222.6	1322.5	1426.2	1533.8	1645.2
59	1036.3	1128.3	1224.2	1324.2	1427.9	1535.6	1647.1
60	1037.8	1129.9	1225.9	1325.9	1429.7	1537.5	1649.0

n.

30″	2″39	2″85	3″36	3″94	4″60	5″33	6″15
40	2.46	2.93	3.45	4.05	4.72	5.46	6.30
50	2.54	3.01	3.55	4.15	4.83	5.60	6.44
60	2.61	3.10	3.64	4.26	4.96	5.73	6.59

m.

	29′	30′	31′	32′	33′	34′	35′
″							
0	1649″0	1764″6	1884″0	2007″4	2134″6	2265″6	2400″6
1	1650.9	1766.6	1886.0	2009.4	2136.8	2267.8	2402.9
2	1652.8	1768.5	1888.0	2011.5	2138.9	2270.0	2405.2
3	1654.7	1770.5	1890.0	2013.6	2141.1	2272.2	2407.5
4	1656.6	1772.4	1892.1	2015.7	2143.2	2274.5	2409.8
5	1658.5	1774.4	1894.1	2017.8	2145.3	2276.7	2412.0
6	1660.4	1776.3	1896.1	2019.9	2147.5	2278.9	2414.3
7	1662.3	1778.3	1898.1	2022.0	2149.7	2281.2	2416.6
8	1664.2	1780.3	1900.2	2024.1	2151.8	2283.4	2418.9
9	1666.1	1782.3	1902.2	2026.2	2153.9	2285.6	2421.2
10	1668.0	1784.2	1904.3	2028.3	2156.1	2287.8	2423.5
11	1669.9	1786.2	1906.3	2030.5	2158.3	2290.0	2425.8
12	1671.9	1788.2	1908.4	2032.5	2160.5	2292.3	2428.1
13	1673.8	1790.1	1910.4	2034.6	2162.6	2294.5	2430.4
14	1675.7	1792.1	1912.4	2036.7	2164.8	2296.8	2432.7
15	1677.6	1794.1	1914.4	2038.8	2166.9	2299.0	2435.0
16	1679.5	1796.1	1916.5	2040.9	2169.1	2301.3	2437.3
17	1681.4	1798.1	1918.5	2043.0	2171.2	2303.6	2439.6
18	1683.3	1800.0	1920.6	2045.1	2173.4	2305.8	2441.9
19	1685.2	1802.0	1922.6	2047.2	2175 6	2308.0	2444.2
20	1687.2	1804.0	1924.7	2049.3	2177.8	2310.2	2446.5
21	1689.1	1805.9	1926.7	2051.4	2179.9	2312.4	2448.8
22	1691.0	1807.9	1928.8	2053.5	2182.1	2314.7	2451.1
23	1692.9	1809.9	1930.8	2055.7	2184.3	2316.9	2453.4
24	1694.8	1811.9	1932.9	2057.8	2186.5	2319.2	2455.7
25	1696.7	1813.9	1935.0	2059.9	2188.6	2321.5	2458.0
26	1698.6	1815.8	1937.0	2062.0	2190.8	2323.7	2460.3
27	1700.5	1817.8	1939,0	2064.1	2193.0	2325.9	2462.6
28	1702.5	1819.8	1941.1	2066.2	2195.2	2328.2	2464.9
29	1704.4	1821.8	1943.1	2068.3	2197.3	2330.4	2467.2
30	1706.3	1823.8	1945.2	2070.4	2199.5	2332.7	2469.5

n.

0″	6″59	7″55	8″61	9″77	11″04	12″44	13″97
10	6.75	7.62	8.79	9.97	11.27	12.69	14.24
20	6.90	7.89	8.98	10.18	11.50	12.94	14.51
30	7.06	8.06	9.17	10.39	11.73	13.19	14.78

m.

"	29′	30′	31′	32′	33′	34′	35′
30	1706"3	1823"8	1945"2	2070"4	2199"5	2332"7	2469"5
31	1708.2	1825.8	1947.2	2072.6	2201.7	2334.9	2471.8
32	1710.2	1827.8	1949.3	2074.7	2203.9	2337.2	2474.2
33	1712.1	1829.8	1951.3	2076.8	2206.1	2339.4	2476.5
34	1714.0	1831.8	1953.4	2078.9	2208.3	2341.7	2478.8
35	1715.9	1833.8	1955.5	2081.0	2210.5	2343.9	2481.1
36	1717.9	1835.8	1957.6	2083.2	2212.7	2346.2	2483.5
37	1719.8	1837.8	1959.6	2085.3	2214.9	2348.5	2485.8
38	1721.7	1839.8	1961.7	2087.4	2217.1	2350.7	2488.1
39	1723.6	1841.8	1963.7	2089.6	2219.3	2353.0	2490.4
40	1725.6	1843.8	1965.8	2091.7	2221.5	2355.2	2492.8
41	1727.5	1845.8	1967.8	2093.8	2223.7	2357.5	2495.1
42	1729.5	1847.8	1969.9	2095.9	2225.9	2359.7	2497.4
43	1731.5	1849.8	1972.0	2098.0	2228.1	2361.9	2499.7
44	1733.4	1851.8	1974.1	2100.2	2230.3	2364.2	2502.1
45	1735.3	1853.8	1976.1	2102.3	2232.5	2366.4	2504.4
46	1737.2	1855.8	1978.2	2104.5	2234.7	2368.7	2506.7
47	1739.2	1857.8	1980.3	2106.6	2236.9	2371.0	2509.0
48	1741.2	1859.8	1982.4	2108.8	2239.1	2373.3	2511.4
49	1743.1	1861.8	1984.4	2110.9	2241.3	2375.5	2513.7
50	1745.1	1863.8	1986.5	2113.1	2243.5	2377.8	2516.1
51	1747.0	1865.8	1988.6	2115.2	2245.7	2380.1	2518.4
52	1749.0	1867.8	1990.7	2117.4	2247.9	2382.4	2520.8
53	1750.9	1869.8	1992.7	2119.6	2250.1	2384.6	2523.1
54	1752.9	1871.8	1994.8	2121.7	2252.3	2386.9	2525.4
55	1554.8	1873.8	1996.9	2123.8	2254.5	2389.2	2527.7
56	1756.8	1875.9	1999.0	2126.0	2256.7	2391.5	2530.1
57	1758.7	1877.9	2001.0	2128.1	2258.9	2393.7	2532.4
58	1760.7	1879.9	2003.1	2130.3	2261.1	2396.0	2534.8
59	1762.6	1882.0	2005.3	2132.4	2263.4	2398.3	2537.1
60	1764.6	1884.0	2007.4	2134.6	2265.6	2400.6	2539.5

n.

30′	7"06	8"06	9"17	10"39	11"73	13"19	14"78
40	7.22	8.24	9.37	10.61	11.96	13.45	15.06
50	7.38	8.42	9.57	10.82	12.20	13.71	15.35
60	7.55	8.61	9.77	11.04	12.24	13.97	15.63

m.

"	36′	37′	38′	39′	40′	41′
0	2539.5	2682"2	2828"8	2979"3	3133"6	3291"8
1	2541.8	2684.6	2831.3	2981.8	3136.2	3294.4
2	2544.2	2687.0	2833.7	2984.4	3138.8	3297.1
3	2546.5	2689.5	2836.2	2986.9	3141.4	3299.8
4	2548.9	2691.9	2838.7	2989.5	3144.0	3302.5
5	2551.2	2694.3	2841.2	2992.0	3146.6	3305.2
6	2553.5	2696.7	2843.6	2994.6	3149.2	3307.9
7	2555.9	2699.1	2846.1	2997.1	3151.8	3310.6
8	2558.3	2701.5	2848.6	2999.7	3154.4	3313.3
9	2560.6	2703.9	2851.1	3002.2	3157.0	3315.9
10	2563.0	2706.3	2853.6	3004.7	3159.7	3318.6
11	2565.3	2708.8	2856.1	3007.2	3162.4	3321.3
12	2567.7	2711.2	2858.6	3009.8	3165.0	3323.9
13	2570.1	2713.6	2861.1	3012.4	3167.6	3326.5
14	2572.4	2716.1	2863.5	3014.9	3170.2	3329.2
15	2574.8	2718.5	2866.0	3017.5	3172.8	3331.9
16	2577.1	2720.9	2868.5	3020.1	3175.4	3334.6
17	2579.5	2723.4	2871.0	3022.6	3178.0	3337.3
18	2581.9	2725.8	2873.5	3025.2	3180.6	3340.0
19	2584.2	2728.2	2876.0	3027.7	3183.3	3342.7
20	2586.6	2730.6	2878.5	3030.3	3185.9	3345.4
21	2589.0	2733.0	2881.0	3032.9	3188.6	3348.1
22	2591.3	2735.5	2883.5	3035.5	3191.2	3350.8
23	2593.7	2738.0	2886.0	3038.0	3193.8	3353.5
24	2596.1	2740.4	2888.5	3040.6	3196.4	3356.2
25	2598.5	2742.8	2891.0	3043.2	3199.0	3358.9
26	2600.8	2745.2	2893.5	3045.8	3201.7	3361.6
27	2603.2	2747.6	2896.0	3048.3	3204.3	3364.3
28	2605.6	2750.0	2898.5	3050.9	3206.9	3367.0
29	2607.9	2752.5	2901.0	3053.4	3209.5	3369.7
30	2610.2	2755.0	2903.6	3056.0	3212.2	3372.4

n.

0"	15"63	17"44	19"40	21"52	23"80	26"27
10	15.92	17.75	19.74	21.88	24.20	26.70
20	16.22	18.08	20.09	22.26	24.61	27.13
30	16.52	18.40	20.44	22.64	25.01	27.57

m.

"	36′	37′	38′	39′	40′	41′
30	2610"2	2755"0	2903"6	3056"9	3212"2	3372"4
31	2612.7	2757.4	2906.1	3058.6	3214.9	3375.1
32	2615.1	2759.9	2908.6	3061.2	3217.5	3377.8
33	2617.5	2762.3	2911.1	3063.7	3220.2	3380.5
34	2619.8	2764.8	2913.6	3066.3	3222.8	3383.2
35	2622.2	2767.2	2916.1	3068.8	3225.5	3385.9
36	2624.6	2769.7	2918.6	3071.4	3228.1	3388.6
37	2627.0	2772.1	2921.1	3074.0	3230.8	3391.3
38	2629.4	2774.6	2923.6	3076.6	3233.4	3394.0
39	2631.8	2777.0	2926.1	3079.2	3236.1	3396.7
40	2634.2	2779.5	2928.7	3081.7	3238.7	3399.5
41	2636.6	2781.9	2931.2	3084.3	3241.4	3402.2
42	2639.0	2784.4	2933.7	3086.8	3244.0	3404.9
43	2641.4	2786.9	2936.3	3089.4	3246.7	3407.6
44	2643.8	2789.3	2938.8	3092.0	3249.3	3410.3
45	2646.2	2791.8	2941.3	3094.6	3252.0	3413.0
46	2648.5	2794.2	2943.9	3097.2	3254.6	3415.7
47	2650.9	2796.7	2946.4	3099.8	3257.3	3418.4
48	2653.3	2799.2	2948.9	3102.4	3259.9	3421.1
49	2655.7	2801.6	2951.4	3105.0	3262.6	3423.9
50	2658.1	2804.1	2953.9	3107.6	3265.2	3426.6
51	2660.5	2806.5	2956.4	3110.2	3267.9	3429.3
52	2662.9	2808.9	2959.0	3112.8	3270.5	3432.1
53	2665.3	2811.4	2961.5	3115.4	3273.2	3434.8
54	2667.7	2813.9	2964.1	3118.0	3275.8	3437.5
55	2670.1	2816.4	2966.6	3120.6	3278.5	3440.3
56	2672.5	2818.9	2969.2	3123.2	3281.1	3443.0
57	2674.9	2821.3	2971.7	3125.8	3283.8	3445.7
58	2677.3	2823.8	2974.3	3128.4	3286.5	3448.5
59	2679.7	2826.3	2976.8	3131.0	3289.1	3451.2
60	2682.2	2828.8	2979.3	3133.6	3291.8	3453.9

n.

30"	16"52	18"40	20"44	22"64	25"01	27"57
40	16.82	18.72	20.79	23.02	25.36	28.01
50	17.13	19.06	21.15	23.41	25.84	28.46
60	17.44	19.40	21.52	23.80	26.27	28.92

log. m.

"	0′	1′	2′	3′	4′
0	— ∞	0.29303	0.89509	1.24707	1.49714
1	6.73673	30739	90230	25208	50076
2	7.33879	32151	90945	25687	50435
3	7.69097	33541	91654	26163	50793
4	7.94085	34909	92357	26636	51150
5	8.13467	36256	93055	27107	51505
6	8.29303	37582	93747	27575	51859
7	8.42693	38888	94434	28041	52211
8	8.54291	40175	95115	28904	52562
9	8.64512	41444	95791	28965	52912
10	8.73673	42693	96462	29423	53260
11	8.81952	43925	97127	29879	53608
12	8.89509	45140	97788	30333	53952
13	8.96462	46338	98443	30784	54296
14	9.02899	47519	99094	31233	54639
15	9.08891	46685	99740	31679	54980
16	9.14497	49836	1.00381	32124	55320
17	9.19763	50971	01017	32566	55659
18	9.24628	52092	01649	33006	55996
19	9.29424	53198	02276	33443	56332
20	9.33879	54291	02898	33878	56667
21	9.38117	55370	03517	34312	57000
22	9.42158	56436	04131	34743	57332
23	9.46019	57489	04740	35172	57663
24	9.49715	58529	05345	35598	57993
25	9.53261	59557	05946	36022	58322
26	9.56668	60573	06543	36446	58648
27	9.59946	61577	07136	36866	58974
28	9.63105	62570	07725	37285	59299
29	9.66153	63551	08310	37702	59622
30	9.69097	64522	08891	38116	59945

log. m.

"	0′	1′	2′	3′	4′
30	9.69097	0.64522	1.08891	1.38116	1.59945
31	9.71946	65481	09468	38529	60266
32	9.74703	66431	10042	38940	60586
33	9.77376	67370	10611	39348	60904
34	9.79969	68299	11177	39755	61222
35	9.82487	69218	11739	40160	61538
36	9.84934	70127	12298	40563	61854
37	9.87314	71027	12853	40964	62168
38	9.89630	71918	13404	41364	62481
39	9.91886	72800	13952	41761	62793
40	9.94085	73673	14497	42157	63103
41	9.96230	74537	15038	42551	63413
42	9.98323	75394	15576	42943	63722
43	0.00367	76240	16110	43333	64029
44	0.02364	77080	16641	43722	64335
45	0.04316	77911	17169	44109	64641
46	0.06225	78734	17694	44494	64945
47	0.08093	79550	18216	44877	65248
48	0.09921	80358	18735	45259	65550
49	0.11712	81158	19250	45639	65851
50	0.13467	81952	19762	46018	66151
51	0.15187	82738	20272	46395	66450
52	0.16874	83517	20778	46770	66748
53	0.18528	84290	21282	47143	67045
54	0.20152	85054	21782	47515	67341
55	0.21746	85813	22280	47886	67636
56	0.23311	86513	22775	48255	67930
57	0.24848	87310	23267	48622	68223
58	0.26359	88049	23757	48988	68515
59	0.27844	88782	24243	49352	68806
60	0.29303	89509	24727	49714	69096

log. m.

"	5′	6′	7′	8′	9′
0	1.69096	1.84931	1.98320	2.09917	2.20146
1	69385	85172	98526	10098	20307
2	69673	85412	98732	10278	20467
3	69960	85651	98937	10458	20627
4	70246	85891	99142	10637	20787
5	70531	86129	99347	10817	20946
6	70816	86366	99551	10995	21106
7	71099	86603	99755	11174	21264
8	71382	86840	99958	11352	21423
9	71663	87075	2.00161	11530	21581
10	71944	87310	00363	11707	21740
11	72223	87545	00565	11884	21897
12	72502	87779	00766	12061	22055
13	72780	88012	00967	12237	22192
14	73057	88244	01167	12413	22369
15	73333	88476	01367	12590	22522
16	73609	88708	01566	12764	22682
17	73883	88938	01765	12939	22838
18	74157	89168	01964	13114	22994
19	74429	89398	02162	13288	23150
20	74701	89627	02360	13462	23304
21	74972	89855	02557	13635	23460
22	75242	90083	02753	13809	23614
23	75511	90310	02950	13982	23768
24	75780	90536	03146	14154	23922
25	76048	90762	03341	14326	24076
26	76314	90986	03536	14498	24230
27	76580	91212	03730	14670	24383
28	76846	91436	03925	14841	24536
29	77110	91660	04119	15011	24689
30	77373	91883	04311	15182	24842

log. m.

"	5′	6′	7′	8′	9′
30	1.77373	1.91883	2.04311	2.15182	2.24842
31	77636	92105	04504	15352	24994
32	77898	92327	04697	15522	25146
33	78160	92548	04888	15691	25297
34	78420	92769	05080	15860	25449
35	78680	92990	05271	16030	25600
36	78928	93209	05462	16198	25751
37	79167	93428	05652	16366	25902
38	79454	93646	05842	16534	26052
39	79707	93864	06031	16701	26202
40	79967	94082	06220	16868	26352
41	80221	94299	06409	17035	26501
42	80476	94515	06597	17202	26651
43	80730	94731	06785	17368	26800
44	80982	94946	06972	17534	26949
45	81234	95161	07160	17700	27097
46	81486	95375	07346	17865	27246
47	81736	95589	07532	18030	27394
48	81986	95802	07718	18194	27542
49	82236	96016	07903	18359	27690
50	82484	96226	08089	18523	27836
51	82732	96438	08273	18687	27984
52	82979	96649	08457	18850	28130
53	83225	96860	08648	19013	28277
54	83471	97070	08824	19176	28423
55	83716	97279	09007	19338	28570
56	83960	97488	09190	19500	28715
57	84204	97697	09372	19662	28861
58	84447	97905	09554	19824	29006
59	84690	98112	09735	19985	29151
60	84931	98320	09917	20146	29296

log. m.

''	10'	11'	12'	13'	14'
0	2.29296	2.37574	2.45130	2.52081	2.58516
1	29441	37705	45250	52192	58619
2	29586	37836	45371	52303	58722
3	29730	37968	45491	52414	58825
4	29874	38098	45611	52525	58928
5	30017	38229	45731	52635	59031
6	30161	38360	45850	52746	59134
7	30304	38490	45970	52856	59236
8	30447	38620	46089	52967	59339
9	30590	38750	46209	53077	59441
10	30732	58880	46328	53187	59543
11	30874	39009	46446	53297	59645
12	31016	39138	46565	53406	59747
13	31158	39268	46684	53516	59849
14	31300	39397	46802	53625	59951
15	31441	39525	46920	53735	60052
16	31582	39654	47038	53844	60154
17	31723	39782	47156	53953	60255
18	31864	39910	47274	54062	60357
19	32004	40038	47392	54170	60458
20	32114	40166	47509	54279	60559
21	32284	40294	47626	54387	60660
22	32424	40421	47743	54496	60760
23	32563	40548	47860	54604	60861
24	32703	40675	47977	54712	60962
25	32842	40802	48094	54820	61062
26	32941	40929	48210	54928	61162
27	33019	41056	48327	55035	61263
28	33258	41172	48443	55143	61363
29	33396	41308	48559	55250	61463
30	33534	41434	48675	55358	61563

log. n.

0"	8.97048	9.13602	9.28712	9.42616	9.55486
10	8.99918	9.16214	9.31110	9.44828	9.57540
20	9.02742	9.18786	9.33472	9.47012	9.59572
30	9.05522	9.21322	9.35804	9.49170	9.61580

log. m.

"	10′	11′	12′	13′	14′
30	2.33534	2.41434	2.48675	2.55358	2.61563
31	33671	41560	48790	55465	61662
32	33809	41685	48906	55572	61762
33	33946	41811	49021	55679	61861
34	34083	41936	49137	55785	61961
35	34220	42061	49253	55892	62060
36	34357	42186	49367	55999	62159
37	34493	42310	49481	56105	62258
38	34630	42435	49596	56211	62357
39	34766	42559	49711	56317	62456
40	34901	42683	49825	56423	62555
41	35037	42807	49939	56529	62654
42	35172	42931	50053	56635	62752
43	35308	43055	50167	56740	62850
44	35442	43178	50281	56846	62949
45	35577	43302	50394	56951	63047
46	35712	43425	50508	57056	63145
47	35846	43548	50621	57161	63243
48	35980	43670	50734	57266	63341
49	36114	43793	50847	57371	63438
50	36248	43915	50960	57476	63536
51	36381	44037	51073	57580	63634
52	36515	44160	51185	57685	63731
53	36648	44281	51298	57789	63828
54	36781	44403	51410	57893	63925
55	36913	44525	51522	57997	64023
56	37046	44646	51634	58101	64119
57	37178	44767	51746	58205	64216
58	37310	44888	51858	58309	64313
59	37442	45009	51969	58412	64410
60	37574	45130	52081	58516	64506

log. n.

30°	9.05522	9.21322	9.35804	9.49170	9.61580
40	9.08256	9.23820	9.38104	9.51300	9.63564
50	9.10950	9.26284	9.40374	9.53406	9.65526
60	9.13602	9.28712	9.42616	9.55486	9.67466

	log. m.				
,,	15′	16′	17′	18′	19′
0	2.64506	2.70110	2.75373	2.80336	2.85029
1	64603	70200	75458	80416	85105
2	64699	70291	75543	80496	85181
3	64795	70381	75628	80576	85257
4	64891	70471	75713	80656	85333
5	64987	70561	75798	80736	85409
6	65083	70651	75883	80816	85485
7	65179	70741	75967	80896	85561
8	65275	70830	76052	80976	85636
9	65370	70920	76136	81056	85712
10	65466	71010	76220	81135	85787
11	65561	71069	76305	81215	85863
12	65656	71188	76389	81295	85938
13	65751	71278	76476	81375	86014
14	65846	71367	76557	81454	86089
15	65941	71456	76641	81533	86164
16	66036	71545	76725	81612	86239
17	66131	71634	76808	81691	86314
18	66226	71723	76892	81770	86389
19	66320	71811	76976	81849	86464
20	66415	71900	77059	81928	86539
21	66509	71989	77143	82007	86614
22	66603	72077	77226	82086	86689
23	66697	72165	77309	82165	86763
24	66791	72254	77392	82244	86838
25	66885	72342	77476	82322	86912
26	66979	72430	77559	82401	86987
27	67073	72518	77642	82479	87061
28	67166	72606	77724	82558	87136
29	67260	72694	77807	82636	87210
30	67353	72781	77890	82714	87284

	log. n.				
0″	9.67466	9.78674	9.89200	9.99126	0.08512
10	9.69386	9.80474	9.90894	0.00724	0.10028
20	9.71284	9.82254	9.92572	0.02310	0.11532
30	9.73160	9.84016	9.94234	0.03882	0.13022

log. m.

"	15′	16′	17′	18′	19′
30	2.67353	2.72781	2.77890	2.82714	2.87284
31	67447	72869	77973	82792	87358
32	67540	72957	78056	82870	87432
33	67633	73044	78138	82948	87506
34	67726	73132	78220	83026	87580
35	67820	73219	78302	83104	87654
36	67912	73306	78385	83182	87728
37	68004	73393	78467	83260	87802
38	68097	73480	78549	83337	87876
39	68189	73567	78631	83414	87949
40	68282	73654	78713	83492	88023
41	68374	73741	78795	83570	88096
42	68466	73827	78877	83648	88170
43	68559	73914	78958	83725	88243
44	68651	74001	79040	83802	88317
45	68742	74087	79121	83879	88390
46	68834	74173	79203	83957	88463
47	68926	74259	79284	84034	88536
48	69018	74346	79366	84111	88600
49	69109	74432	79447	84188	88683
50	69201	74518	79528	84264	88756
51	69292	74604	79609	84341	88828
52	69383	74690	79690	84418	88901
53	69474	74775	79771	84495	88974
54	69565	74861	79852	84571	89047
55	69656	74947	79933	84648	89119
56	69747	75032	80014	84724	89192
57	69838	75118	80094	84801	89265
58	69929	75203	80175	84877	89337
59	70019	75288	80255	84953	89410
60	70110	75373	80336	85029	89482

log. n.

30′	9.73160	9.84016	9.94234	0.03882	0.13022
40	9.75018	9.85762	9.95880	0.05438	0.14500
50	9.76856	9.87490	9.97510	0.06982	0.15966
60	9.78674	9.89200	9.99126	0.08512	0.17418

log. m.

"	20′	21′	22′	23′	24′
0	2.89482	2.93717	2.97755	3.01613	3.05306
1	89554	93786	97820	01675	05366
2	89626	93855	97886	01738	05426
3	89699	93923	97952	01801	05487
4	89771	93992	98017	01864	05547
5	89833	94061	98083	01926	05607
6	89915	94129	98148	01989	05667
7	89987	94198	98214	02052	05727
8	90059	94266	98279	02114	05787
9	90130	94335	98344	02177	05847
10	90202	94403	98410	02239	05907
11	90274	94471	98475	02302	05966
12	90346	94540	98540	02364	06026
13	90417	94608	98605	02426	06086
14	90489	94676	98670	02489	06146
15	90560	94744	98735	02551	06205
16	90632	94812	98800	02613	06265
17	90703	94880	98865	02675	06324
18	90774	94948	98930	02737	06384
19	90845	95016	98995	02799	06444
20	90917	95084	99060	02861	06503
21	90988	95152	99125	02923	06562
22	91059	95219	99189	02985	06622
23	91130	95287	99254	03047	06681
24	91201	95355	99319	03109	06740
25	91273	95422	99383	03171	06800
26	91343	95490	99448	03232	06859
27	91413	95557	99512	03294	06918
28	91484	95625	99576	03356	06977
29	91555	95692	99641	03417	07036
30	91625	95759	99705	03479	07095

log. n.

0"	0.17418	0.25888	0.33964	0.41680	0.49066
10	0.18858	0.27260	0.35274	0.42932	0.50268
20	0.20288	0.28622	0.36574	0.44176	0.51460
30	0.21704	0.29972	0.37864	0.45412	0.52644

log. m.

"	20′	21′	22′	23′	24′
30	2.91625	2.95759	2.99705	3.03476	3.07095
31	91696	95827	99769	03539	07154
32	91766	95894	99834	03602	07213
33	91837	95961	99898	03663	07272
34	91907	96028	99962	03725	07331
35	91977	96095	3.00026	03787	07389
36	92048	96162	00090	03848	07449
37	92118	96229	00154	03909	07508
38	92188	96296	00218	03970	07567
39	92258	96362	00282	04031	07625
40	92328	96429	00346	04092	07684
41	92398	96496	00409	04153	07742
42	92468	96563	00473	04214	07801
43	92538	96630	00537	04275	07859
44	92608	96696	00600	04336	07918
45	92677	96763	00664	04397	07976
46	92747	96829	00728	04458	08035
47	92817	96896	00791	04519	08094
48	92886	96962	00855	04580	08152
49	92956	97028	00918	04641	08210
50	93026	77095	00981	04701	08268
51	93096	97161	01045	04762	08326
52	93164	97227	01108	04823	08384
53	93233	97293	01171	04883	08442
54	93303	97359	01234	04944	08501
55	93372	97425	01298	05004	08559
56	93441	97491	01361	05065	08617
57	93510	97557	01424	05125	08675
58	93579	97623	01487	05185	08733
59	93648	97689	01550	05246	08791
60	93717	97755	01613	05306	08848

log. n.

30	0.21704	0.29972	0.37864	0.45412	0.52644
40	0.23110	0.31312	0.39146	0.46638	0.53822
50	0.24504	0.32644	0.40416	0.47856	0.54990
60	0.25888	0.33964	0.41680	0.49066	0.56150

log. m.

"	25′	26′	27′	28′	29′
0	3.08848	3.12252	3.15526	3.18681	3.21725
1	08906	12307	15580	18733	21775
2	08964	12363	15633	18784	21825
3	09022	12418	15686	18836	21875
4	09079	12474	15740	18887	21924
5	09137	12529	15793	18939	21974
6	09195	12585	15847	18990	22024
7	09252	12640	15900	19042	22073
8	09310	12695	15953	19093	22123
9	09367	12751	16007	19145	22172
10	09425	12806	16060	19196	22222
11	09482	12861	16113	19247	22272
12	09540	12916	16166	19299	22321
13	09597	12972	16220	19350	22371
14	09655	13027	16273	19401	22420
15	09712	13082	16326	19452	22470
16	09769	13137	16379	19503	22519
17	09826	13192	16432	19554	22568
18	09883	13247	16485	19606	22618
19	09941	13302	16538	19657	22667
20	09998	13357	16591	19708	22716
21	10055	13412	16643	19759	22766
22	10112	13467	16696	19810	22815
23	10169	13521	16749	19861	22864
24	10226	13576	16802	19912	22913
25	10283	13631	16855	19962	22963
26	10340	13686	16907	20013	23012
27	10396	13740	16960	20064	23061
28	10453	13795	17013	20115	23110
29	10510	13850	17066	20166	23159
30	10567	13904	17118	20216	23208

log. n.

0″	0.56150	0.62958	0.69506	0.75816	0.81904
10	0.57304	0.64066	0.70574	0.76846	0.82898
20	0.58450	0.65168	0.71636	0.77870	0.83886
30	0.59588	0.66262	0.72690	0.78886	0.84870

log. m.

m	25′	26′	27′	28′	29′
30	3.10567	3.13904	3.17118	3.20216	3.23208
31	10623	13959	17170	20267	23257
32	10680	14013	17223	20318	23306
33	10737	14068	17275	20369	23355
34	10793	14122	17327	20419	23404
35	10850	14177	17380	20470	23453
36	10906	14231	17433	20520	23501
37	10963	14285	17485	20571	23550
38	11019	14340	17538	20621	23599
39	11076	14394	17590	20672	23648
40	11132	14448	17642	20722	23697
41	11188	14502	17694	20772	23745
42	11245	14557	17746	20822	23794
43	11301	14611	17799	20873	23843
44	11357	14665	17851	20924	23891
45	11413	14719	17903	20974	23940
46	11469	14773	17955	21024	23988
47	11525	14827	18007	21075	24037
48	11582	14881	18059	21125	24086
49	11638	14935	18111	21175	24134
50	11694	14989	18163	21225	24182
51	11750	15043	18215	21275	24231
52	11805	15096	18267	21325	24279
53	11861	15150	18319	21375	24328
54	11917	15204	18371	21425	24376
55	11973	15258	18422	21475	24424
56	12029	15312	18474	21525	24473
57	12085	15365	18526	21575	24521
58	12140	15419	18578	21625	24569
59	12196	15472	18629	21675	24617
60	12252	15526	18681	21725	24666

log. n.

30″	0.59588	0.66262	0.72690	0.78886	0.84870
40	0.60718	0.67350	0.73738	0.79898	0.85848
50	0.61842	0.68432	0.74780	0.80904	0.86818
60	0.62958	0.69506	0.75816	0.81904	0.87885

	log. m.				
"	30′	31′	32′	33′	34′
0	3.24665	3.27509	3.30262	3.32931	3.35519
1	24713	27556	30308	32975	35562
2	24762	27602	30353	33018	35604
3	24810	27649	30398	33062	35647
4	24858	27695	30443	33106	35689
5	24906	27742	30488	33149	35731
6	24954	27788	30533	33193	35774
7	25002	27835	30578	33237	35816
8	25050	27881	30622	33280	35858
9	25098	27928	30668	33324	35901
10	25146	27974	30713	33368	35943
11	25194	28021	30758	33411	35985
12	25242	28067	30803	33455	36028
13	25289	28113	30848	33498	36070
14	25337	28159	30892	33542	36112
15	25385	28206	30937	33585	36154
16	25433	28252	30982	33629	36196
17	25481	28298	31027	33672	36239
18	25528	28344	31072	33715	36281
19	25576	28391	31116	33759	36323
20	25624	28437	31161	33802	36365
21	25671	28483	31206	33846	36407
22	25719	28529	31250	33889	36449
23	25767	28575	31295	33932	36491
24	25814	28621	31340	33975	36533
25	25862	28667	31384	34019	36575
26	25909	28713	31429	34062	36617
27	25956	28759	31473	34105	36659
28	26004	28805	31518	34148	36701
29	26051	28851	31562	34192	36743
30	26099	28897	31607	34235	36785

	log. n.				
0"	0.87885	0.93473	0.98979	1.04316	1.09493
10	0.88746	0.94402	0.99879	1.05190	1.10341
20	0.89702	0.95328	1.00777	1.06059	1.11184
30	0.90652	0.96248	1.01668	1.06924	1.12024

log. m.

"	30′	31′	32′	33′	34′
30	3.26099	3.28897	3.31607	3.34235	3.36785
31	26146	28943	31651	34278	36827
32	26194	28988	31696	34321	36868
33	26241	29034	31740	34364	36910
34	26288	29080	31785	34407	36952
35	26336	29126	31829	34450	36994
36	26383	29172	31873	34493	37036
37	26430	29217	31918	34536	37077
38	26477	29263	31962	34579	37119
39	26524	29309	32006	34622	37161
40	26572	29354	32050	34665	37203
41	26619	29400	32095	34708	37244
42	26666	29446	32139	34751	37286
43	26713	29491	32183	34794	37328
44	26760	29537	32227	34836	37369
45	26807	29582	32271	34879	37411
46	26854	29628	32315	34922	37452
47	26901	29673	32360	34965	37494
48	26948	29719	32404	35008	37535
49	26995	29764	32448	35050	37577
50	27042	29810	32492	35093	37618
51	27088	29855	32536	35136	37660
52	27135	29900	32580	35178	37701
53	27182	29946	32624	35221	37743
54	27229	29991	32668	35264	37784
55	27276	30036	32712	35306	37826
56	27322	30082	32755	35349	37867
57	27369	30127	32799	35392	37908
58	27416	30172	32843	35434	37950
59	27463	30217	32887	35477	37991
60	27509	30262	32931	35520	38032

log. n.

30"	0.90652	0.96248	1.01668	1.06924	1.12024
40	0.91598	0.97163	1.02555	1.07784	1.12860
50	0.92538	0.98074	1.03438	1.08641	1.13691
60	0.93473	0.98979	1.04316	1,09493	1.14519

log. m.

m	35′	36′	37′	38′	39′
0	3.38032	3.40474	3.42849	3.45160	3.47411
1	38073	40514	42888	45198	47448
2	38115	40554	42927	45236	47485
3	38156	40595	42965	45274	47522
4	38197	40635	43004	45312	47559
5	38238	40675	43044	45350	47596
6	38280	40715	43083	45388	47633
7	38321	40755	43122	45426	47670
8	38362	40795	43161	45464	47707
9	38403	40835	43200	45502	47744
10	38444	40875	43239	45539	47781
11	38485	40915	43277	45577	47817
12	38526	40955	43316	45615	47854
13	38567	40995	43355	45658	47891
14	38608	41034	43394	45691	47927
15	38649	41074	43433	45728	47965
16	38690	41114	43471	45766	48002
17	38731	41154	43510	45804	48038
18	38772	41194	43549	45842	48075
19	38813	41233	43588	45879	48112
20	38854	41273	43626	45917	48149
21	38895	41313	43665	45955	48185
22	38936	41353	43704	45992	48222
23	38976	41392	43742	56030	48259
24	39017	41432	43781	46068	48295
25	39058	41472	43820	46105	48332
26	39099	41511	43858	46143	48369
27	39140	41551	43897	46180	48405
28	39180	41591	43935	46218	48442
29	39221	41630	43974	46255	48478
30	39262	41670	44012	46293	48515

log. n.

0^{m}	1.14519	1.19403	1.24152	1.28775	1.33277
10	1.15343	1.20204	1.24902	1.29533	1.34016
20	1.16162	1.21001	1.25707	1.30289	1.34752
30	1.16978	1.21794	1.26479	1.31041	1.35484

log. m.

"	35′	36′	37′	38′	39′
30	3.39262	3.41670	3.44012	3.46293	3.48515
31	39303	41709	44051	46331	48551
32	39343	41749	44089	46368	48588
33	39384	41788	44128	46405	48625
34	39424	41828	44166	46443	48661
35	39465	41867	44205	46480	48698
36	39506	41907	44243	46518	48734
37	39546	41946	44282	46555	48770
38	39587	41986	44320	46593	48807
39	39627	42025	44358	46630	48843
40	39668	42065	44397	46667	48880
41	39708	42104	44435	46705	48916
42	39749	42143	44473	46742	48953
43	39789	42183	44512	46779	48989
44	39830	42222	44550	46817	49025
45	39870	42261	44588	46854	49062
46	39911	42301	44626	46891	49098
47	39951	42340	44665	46928	49134
48	39991	42379	44703	46966	49170
49	40032	42419	44741	47003	49207
50	40072	42458	44779	47040	49243
51	40112	42497	44817	47077	49279
52	40153	42536	44856	47114	49315
53	40193	42575	44894	47152	49352
54	40233	42614	44932	47189	49388
55	40273	42654	44970	47226	49424
56	40314	42693	45008	47263	49460
57	40354	42732	45046	47300	49496
58	40394	42771	45084	47337	49533
59	40434	42810	45122	47374	49569
60	40474	42849	45160	47411	49605

log. n.

30″	1.16978	1.21794	1.26479	1.31041	1.35484
40	1.17790	1.22584	1.27248	1.31789	1.36214
50	1.18598	1.23380	1.28013	1.32535	1.36941
60	1.19403	1.24152	1.28775	1.33277	1.37664

log. m.

"	40′	41′	"	40′	41′
0	3.49605	3.51744	30	3.50681	3.52794
1	49641	51779	31	50717	52829
2	49677	51814	32	50752	52863
3	49713	51849	33	50788	52898
4	49749	51885	34	50823	52933
5	49785	51920	35	50859	52968
6	49821	51955	36	50895	53002
7	49857	51990	37	50930	53037
8	49893	52025	38	50966	53072
9	49929	52060	39	51001	53106
10	49965	52095	40	51037	53141
11	50001	52130	41	51072	53176
12	50037	52165	42	51108	53210
13	50073	52201	43	51143	53245
14	50109	52236	44	51179	53280
15	50145	52271	45	51214	53314
16	50180	52306	46	51250	53349
17	50216	52341	47	51285	53383
18	50252	52375	48	51320	53418
19	50288	52410	49	51356	53452
20	50324	52445	50	51391	53487
21	50360	52480	51	51426	53521
22	50395	52515	52	51462	53556
23	50431	52550	53	51497	53590
24	50467	52585	54	51532	53625
25	50503	52620	55	51568	53659
26	50538	52655	56	51603	53694
27	50574	52690	57	51638	53728
28	50610	52724	58	51673	53763
29	50645	52759	59	51709	53797
30	50681	52794	60	51744	53831

log. n.

0″	1.37664	1.41942	30″	1.39716	1.44042
10	1.38384	1.42645	40	1.40428	1.44737
20	1.39102	1.43345	50	1.41237	1.45428
30	1.39816	1.44042	60	1.41942	1.46117

Argument: Halbe Zwischenzeit.

Arg.	log. A	log. B	Arg.	log. A	log. B	Arg.	log. A	log. B
0h 1′	7.7247	7.7247	0h41′	7.7270	7.7200	1h21′	7.7338	7.7061
2	7.7247	7.7247	42	7.7271	7.7198	22	7.7340	7.7056
3	7.7247	7.7247	43	7.7272	7.7196	23	7.7342	7.7051
4	7.7247	7.7247	44	7.7274	7.7193	24	7.7345	7.7046
5	7.7247	7.7246	45	7.7275	7.7191	25	7.7347	7.7041
6	7.7247	7.7246	46	7.7276	7.7188	26	7.7349	7.7036
7	7.7248	7.7246	47	7.7277	7.7186	27	7.7352	7.7031
8	7.7248	7.7245	48	7.7279	7.7183	28	7.7354	7.7026
9	7.7248	7.7245	49	7.7280	7.7180	29	7.7357	7.7021
10	7.7248	7.7244	50	7.7281	7.7177	30	7.7359	7.7015
11	7.7249	7.7244	51	7.7283	7.7174	31	7.7362	7.7010
12	7.7249	7.7243	52	7.7284	7.7172	32	7.7364	7.7005
13	7.7249	7.7242	53	7.7286	7.7169	33	7.7367	7.6999
14	7.7250	7.7242	54	7.7287	7.7166	34	7.7369	7.6993
15	7.7250	7.7241	55	7.7289	7.7162	35	7.7372	7.6988
16	7.7251	7.7240	56	7.7290	7.7159	36	7.7374	7.6982
17	7.7251	7.7239	57	7.7292	7.7156	37	7.7377	7.6976
18	7.7252	7.7238	58	7.7293	7.7153	38	7.7380	7.6970
19	7.7252	7.7237	59	7.7295	7.7150	39	7.7383	7.6964
20	7.7253	7.7236	1 0	7.7297	7.7146	40	7.7386	7.6958
21	7.7253	7.7235	1	7.7298	7.7143	41	7.7388	7.6952
22	7.7254	7.7234	2	7.7300	7.7139	42	7.7391	7.6946
23	7.7254	7.7232	3	7.7302	7.7136	43	7.7394	7.6940
24	7.7255	7.7231	4	7.7304	7.7132	44	7.7397	7.6934
25	7.7256	7.7230	5	7.7305	7.7128	45	7.7400	7.6927
26	7.7256	7.7228	6	7.7307	7.7125	46	7.7403	7.6921
27	7.7257	7.7227	7	7.7309	7.7121	47	7.7406	7.6914
28	7.7258	7.7225	8	7.7311	7.7117	48	7.7409	7.6908
29	7.7259	7.7224	9	7.7313	7.7113	49	7.7412	7.6901
30	7.7259	7.7222	10	7.7315	7.7109	50	7.7415	7.6894
31	7.7260	7.7220	11	7.7317	7.7105	51	7.7418	7.6888
32	7.7261	7.7219	12	7.7319	7.7101	52	7.7421	7.6881
33	7.7262	7.7217	13	7.7321	7.7097	53	7.7424	7.6874
34	7.7263	7.7215	14	7.7323	7.7092	54	7.7428	7.6867
35	7.7264	7.7213	15	7.7325	7.7088	55	7.7431	7.6859
36	7.7265	7.7211	16	7.7327	7.7083	56	7.7434	7.6852
37	7.7266	7.7209	17	7.7329	7.7079	57	7.7437	7.6845
38	7.7267	7.7207	18	7.7331	7.7075	58	7.7441	7.6838
39	7.7268	7.7205	19	7.7333	7.7070	59	7.7444	7.6830
0 40	7.7269	7.7203	1 20	7.7336	7.7065	2 0	7.7447	7.6823

Argument: Halbe Zwischenzeit.								
Arg.	log. A	log. B	Arg.	log. A	log. B	Arg.	log. A	log. B
2h 1′	7·7451	7·6815	2h41′	7·7610	7·6437	3h21′	7·7819	7·5877
2	7·7454	7·6807	42	7·7615	7·6425	22	7·7825	7·5860
3	7·7458	7·6800	43	7·7620	7·6414	23	7·7831	7·5843
4	7·7461	7·6792	44	7·7624	7·6402	24	7·7836	7·5825
5	7·7564	7·6784	45	7·7629	7·6390	25	7·7842	7·5808
6	7·7468	7·6776	46	7·7634	7·6378	26	7·7848	7·5790
7	7·7472	7·6768	47	7·7638	7·6366	27	7·7854	7·5772
8	7·7475	7·6759	48	7·7643	7·6354	28	7·7860	7·5754
9	7·7479	7·6751	49	7·7648	7·6342	29	7·7867	7·5736
10	7·7482	7·6743	50	7·7653	7·6329	30	7·7873	7·5717
11	7·7486	7·6734	51	7·7658	7·6317	31	7·7879	7·5699
12	7·7490	7·6726	52	7·7663	7·6304	32	7·7885	7·5680
13	7·7494	7·6717	53	7·7668	7·6291	33	7·7891	7·5661
14	7·7497	7·6708	54	7·7673	7·6278	34	7·7898	7·5641
15	7·7501	7·6700	55	7·7678	7·6265	35	7·7904	7·5622
16	7·7505	7·6691	56	7·7683	7·6252	36	7·7910	7·5602
17	7·7509	7·6682	57	7·7688	7·6239	37	7·7916	7·5582
18	7·7513	7·6673	58	7·7693	7·6225	38	7·7923	7·5562
19	7·7517	7·6663	59	7·7698	7·6212	39	7·7929	7·5542
20	7·7521	7·6654	3 0	7·7703	7·6198	40	7·7936	7·5522
21	7·7525	7·6645	1	7·7708	7·6184	41	7·7942	7·5501
22	7·7529	7·6635	2	7·7713	7·6170	42	7·7949	7·5480
23	7·7533	7·6626	3	7·7719	7·6156	43	7·7955	7·5459
24	7·7537	7·6616	4	7·7724	7·6142	44	7·7962	7·5437
25	7·7541	7·6606	5	7·7729	7·6127	45	7·7969	7·5416
26	7·7545	7·6597	6	7·7735	7·6113	46	7·7975	7·5394
27	7·7549	7·6587	7	7·7740	7·6098	47	7·7982	7·5372
28	7·7553	7·6577	8	7·7745	7·6083	48	7·7989	7·5350
29	7·7557	7·6567	9	7·7751	7·6068	49	7·7995	7·5327
30	7·7562	7·6556	10	7·7756	7·6053	50	7·8002	7·5304
31	7·7566	7·6546	11	7·7762	7·6038	51	7·8009	7·5281
32	7·7570	7·6536	12	7·7767	7·6023	52	7·8016	7·5258
33	7·7575	7·6525	13	7·7773	7·6007	53	7·8023	7·5234
34	7·7579	7·6514	14	7·7779	7·5991	54	7·8030	7·5211
35	7·7583	7·6504	15	7·7784	7·5975	55	7·8037	7·5186
36	7·7588	7·6493	16	7·7790	7·5959	56	7·8044	7·5162
37	7·7592	7·6482	17	7·7796	7·5943	57	7·8051	7·5137
38	7·7597	7·6471	18	7·7801	7·5927	58	7·8058	7·5112
39	7·7601	7·6460	19	7·7807	7·5910	59	7·8065	7·5087
2 40	7·7606	7·6448	3 20	7·7813	7·5894	4 0	7·8072	7·5062

Argument: Halbe Zwischenzeit.

Arg.	log. A	log. B	Arg.	log. A	log. B	Arg.	log. A	log. B
4h 1′	7.8079	7.5036	4h41′	7.8396	7.3684	5h21′	7.8773	7.1061
2	7.8086	7.5010	42	7.8404	7.3639	22	7.8784	7.0960
3	7.8094	7.4983	43	7.8413	7.3594	23	7.8794	7.0855
4	7.8101	7.4957	44	7.8422	7.3548	24	7.8804	7.0748
5	7.8108	7.4930	45	7.8430	7.3501	25	7.8815	7.0637
6	7.8116	7.4902	46	7.8439	7.3454	26	7.8825	7.0522
7	7.8123	7.4874	47	7.8448	7.3406	27	7.8836	7.0404
8	7.8130	7.4846	48	7.8457	7.3357	28	7.8846	7.0282
9	7.8138	7.4818	49	7.8466	7.3307	29	7.8857	7.0156
10	7.8145	7.4789	50	7.8475	7.3256	30	7.8868	7.0025
11	7.8153	7.4760	51	7.8484	7.3205	31	7.8878	6.9889
12	7.8160	7.4731	52	7.8493	7.3152	32	7.8889	6.9748
13	7.8168	7.4701	53	7.8502	7.3099	33	7.8900	6.9602
14	7.8176	7.4671	54	7.8511	7.3045	34	7.8911	6.9449
15	7.8183	7.4640	55	7.8520	7.2989	35	7.8922	6.9290
16	7.8191	7.4609	56	7.8530	7.2933	36	7.8932	6.9125
17	7.8199	7.4578	57	7.8539	7.2876	37	7.8943	6.8953
18	7.8206	7.4546	58	7.8548	7.2817	38	7.8954	6.8770
19	7.8214	7.4514	59	7.8558	7.2758	39	7.8965	6.8580
20	7.8222	7.4482	5 0	7.8567	7.2697	40	7.8977	6.8379
21	7.8230	7.4449	1	7.8576	7.2635	41	7.8988	6.8168
22	7.8238	7.4415	2	7.8586	7.2572	42	7.8999	6.7945
23	7.8246	7.4381	3	7.8595	7.2507	43	7.9010	6.7709
24	7.8254	7.4347	4	7.8605	7.2442	44	7.9021	6.7457
25	7.8262	7.4312	5	7.8614	7.2374	45	7.9033	6.7189
26	7.8270	7.4277	6	7.8624	7.2306	46	7.9044	6.6901
27	7.8278	7.4241	7	7.8634	7.2236	47	7.9055	6.6591
28	7.8286	7.4205	8	7.8643	7.2164	48	7.9067	6.6255
29	7.8294	7.4168	9	7.8653	7.2091	49	7.9078	6.5889
30	7.8302	7.4131	10	7.8663	7.2016	50	7.9090	6.5487
31	7.8311	7.4093	11	7.8673	7.1940	51	7.9102	6.5041
32	7.8319	7.4055	12	7.8683	7.1861	52	7.9113	6.4541
33	7.8328	7.4016	13	7.8693	7.1781	53	7.9125	6.3973
34	7.8336	7.3977	14	7.8703	7.1699	54	7.9137	6.3316
35	7.8344	7.3937	15	7.8713	7.1615	55	7.9148	6.2536
36	7.8353	7.3876	16	7.8723	7.1529	56	7.9160	6.1579
37	7.8361	7.3855	17	7.8733	7.1440	57	7.9172	6.0341
38	7.8370	7.3813	18	7.8743	7.1349	58	7.9184	5.8593
39	7.8378	7.3771	19	7.8753	7.1256	59	7.9196	5.5594
4 40	7.8387	7.3728	5 20	7.8763	7.1160	6 0	7.9208	— ∞

½ T	log. f	Diff.	½ T	log. f	Diff.	½ T	log. f.	Diff.
6h 1′	0.0024		6h41′	0.0994		7h21′	0.1988	
		24			24			26
2	0048		42	1018		22	2014	
		24			25			25
3	0072		43	1043		23	2039	
		25			24			26
4	0097		44	1067		24	2065	
		24			25			25
5	0121		45	1092		25	2090	
		24			24			26
6	0.0145		46	0.1116		26	0.2116	
		24			25			26
7	0169		47	1141		27	2142	
		24			24			25
8	0193		48	1165		28	2167	
		24			25			26
9	0217		49	1190		29	2193	
		24			24			26
10	0241		50	1214		30	2219	
		24			25			26
11	0.0265		51	0.1239		31	0.2245	
		25			25			26
12	0290		52	1264		32	2271	
		24			24			25
13	0314		53	1288		33	2296	
		24			25			26
14	0338		54	1313		34	2322	
		24			25			26
15	0362		55	1338		35	2348	
		24			25			26
16	0.0386		56	0.1363		36	0.2374	
		24			25			26
17	0410		57	1388		37	2400	
		25			24			26
18	0435		58	1412		38	2426	
		24			24			26
19	0459		59	1436		39	2452	
		24			25			26
20	0483		7 0	1461		40	2478	
		24			25			26
21	0.0507		1	0.1486		41	0.2504	
		24			25			26
22	0531		2	1511		42	2530	
		25			25			27
23	0556		3	1536		43	2557	
		24			25			26
24	0580		4	1561		44	2583	
		24			25			26
25	0604		5	1586		45	2609	
		24			25			27
26	0.0628		6	0.1611		46	0.2636	
		25			25			26
27	0653		7	1636		47	2662	
		24			25			27
28	0677		8	1661		48	2689	
		25			25			26
29	0702		9	1686		49	2715	
		24			25			27
30	0726		10	1711		50	2742	
		24			25			27
31	0.0750		11	0.1736		51	0.2769	
		25			25			26
32	0775		12	1761		52	2795	
		24			26			27
33	0799		13	1787		53	2822	
		24			25			26
34	0823		14	1812		54	2848	
		24			25			27
35	0847		15	1837		55	2875	
		25			25			27
36	0.0872		16	0.1862		56	0.2902	
		24			25			27
37	0896		17	1887		57	2929	
		24			26			27
38	0920		18	1913		58	2956	
		25			25			27
39	0945		19	1938		59	2983	
		24			25			27
6 40	0969		7 20	1963		8 0	3010	
		25			25			28

½ T	log. f	Diff.	½ T	log. f	Diff.	½ T	log. f	Diff.
8h 1′	0.3038		8h41′	0.4180		9h21′	0.5476	
		27			30			35
2	3065	27	42	4210	31	22	5511	36
3	3092	27	43	4241	30	23	5547	35
4	3119	28	44	4271	30	24	5582	35
5	3147	27	45	4301	31	25	5617	36
6	0.3174	28	46	0.4332	31	26	0.5653	36
7	3202	28	47	4363	31	27	5689	37
8	3230	27	48	4394	31	28	5726	36
9	3257	28	49	4425	30	29	5762	36
10	3285	28	50	4455	32	30	5798	37
11	0.3313	28	51	0.4487	31	31	0.5835	37
12	3341	27	52	4518	31	32	5872	37
13	3368	28	53	4549	32	33	5909	37
14	3396	28	54	4581	31	34	5946	37
15	3424	29	55	4612	32	35	5983	38
16	0.3453	28	56	0.4644	32	36	0.6021	38
17	3481	28	57	4676	31	37	6059	38
18	3509	28	58	4707	32	38	6097	38
19	3537	29	59	4739	32	39	6135	38
20	3566	28	9 0	4771	33	40	6173	39
21	0.3594	29	1	0.4804	32	41	0.6212	39
22	3623	28	2	4836	33	42	6251	39
23	3651	29	3	4869	32	43	6290	39
24	3680	29	4	4901	33	44	6329	39
25	3709	29	5	4934	33	45	6368	40
26	0.3738	29	6	0.4967	33	46	0.6408	40
27	3767	29	7	5000	33	47	6448	41
28	3796	29	8	5033	33	48	6489	40
29	3825	29	9	5066	33	49	6529	40
30	3854	29	10	5099	34	50	6569	41
31	0.3883	29	11	0.5133	34	51	0.6610	42
32	3912	30	12	5167	33	52	6652	41
33	3942	29	13	5200	34	53	6693	42
34	3971	30	14	5234	34	54	6735	41
35	4001	29	15	5268	35	55	6776	42
36	0.4030	30	16	0.5303	34	56	0.6818	43
37	4060	30	17	5337	35	57	6861	42
38	4090	30	18	5372	34	58	6903	43
39	4120	30	19	5406	35	59	6946	44
8 40	4150	30	9 20	5441	35	10 0	6990	43

½ T	log. f	Diff.	½ T	log. f	Diff.	½ T	log. f	Diff.
10h 1′	0.7033	44	10h 26′	0.8234	54	10h 51′	0.9747	70
2	7077	44	27	8288	54	52	9817	71
3	7121	45	28	8342	54	53	9888	72
4	7166	45	29	8396	55	54	0.9960	73
5	7211	45	30	8451	55	55	1.0033	74
6	0.7256	45	31	0.8506	56	56	1.0107	75
7	7301	46	32	8562	57	57	0182	76
8	7347	46	33	8619	57	58	0258	78
9	7393	46	34	8676	58	59	0336	78
10	7439	47	35	8734	58	11 0	0414	80
11	0.7486	47	36	0.8792	59	1	1.0494	80
12	7533	48	37	8851	59	2	0574	82
13	7581	48	38	8910	60	3	0656	84
14	7629	48	39	8970	61	4	0740	85
15	7677	49	40	9031	61	5	0825	86
16	0.7726	49	41	0.9092	63	6	1.0911	88
17	7775	49	42	9155	62	7	0999	89
18	7824	50	43	9217	64	8	1088	91
19	7874	50	44	9281	64	9	1179	92
20	7924	51	45	9345	65	10	1271	94
21	0.7975	51	46	0.9410	66	11	1.1365	96
22	8026	51	47	9476	67	12	1461	98
23	8077	52	48	9543	67	13	1559	100
24	8129	53	49	9610	68	14	1659	102
10 25	8182	52	10 50	9678	69	11 15	1761	

Reduction der Zeit auf das Bessel'sche Jahr.

1850	−	5h	2m	16s.0
1851	−	10	51	1.9
1852	+	7	20	12.0
1853	+	1	31	25.9
1854	−	4	17	20.3
1855	−	10	6	6.2
1856	+	8	5	7.9
1857	+	2	16	21.7
1858	−	3	32	24.2
1859	−	9	21	10.4
1860	+	8	50	3.7
1861	+	3	1	17.4
1862	−	2	47	28.5
1863	−	8	36	14.4
1864	+	9	34	59.5
1865	+	3	46	13.4
1866	−	2	2	32.8
1867	−	7	51	18.7
1868	+	10	19	55.3
1869	+	4	31	9.1
1870	−	1	17	36.8
1871	−	7	6	23.0
1872	+	11	4	51.1
1873	+	5	16	4.8
1874	−	0	32	41.1
1875	−	6	21	27.0
1876	+	11h	49m	46s.9
1877	+	6	1	0.8
1878	+	0	12	14.6
1879	−	5	36	31.3
1880	+	12	34	42.7
1881	+	6	45	56.5
1882	+	0	57	10.6
1883	−	4	51	35.6
1884	+	13	19	38.5
1885	+	7	30	52.5
1886	+	1	42	6.3
1887	−	4	6	39.6
1888	+	14	4	34.3
1889	+	6	15	48.2
1890	+	2	27	2.0
1891	−	3	21	43.9
1892	+	14	49	30.1
1893	+	9	0	44.0
1894	+	3	11	58.0
1895	−	2	36	48.2
1896	+	15	44	25.9
1897	+	9	45	40.0
1898	+	3	56	53.8
1899	−	1	51	52.1
1900	−	7	40	38.3

Jahre	Epochen	Arg. Tage	Bewegung. + Solar-Nut.
1871	$18^h 38^m 41^s 67$		
1872	18 37 44.37	0	$0^h\ 0^m\ 0^s 00$
1873	18 40 43.64	10	0 39 25.58
1874	18 39 46.34	20	1 18 51.15
1875	18 38 49.05	30	1 58 16.71
1876	18 37 51.75	40	2 37 42.27
1877	18 40 51.02	50	3 17 7.81
1878	18 39 53.72	60	3 56 33.35
1879	18 38 56.43	70	4 35 58.88
1880	18 37 59.13	80	5 15 24.41
1881	18 40 58.40	90	5 54 49.94
1882	18 40 1.10	100	6 34 15.47
1883	18 39 3.81	110	7 13 41.00
1884	18 38 6.51	120	7 53 6.55
1885	18 41 5.78	130	8 32 32.10
1886	18 40 8.48	140	9 11 57.66
1887	18 39 11.19	150	9 51 23.23
1888	18 38 13.89	160	10 30 48.81
1889	18 41 13.16	170	11 10 14.38
1890	18 40 15.87	180	11 49 39.96
1891	18 39 18.57	190	12 29 5.53
		200	13 8 31.10
		210	13 47 56.67
		220	14 27 22.22
		230	15 6 47.77
		240	15 46 13.31
		250	16 25 38.84
		260	17 5 4.37
		270	17 44 29.90
		280	18 23 55.43
		290	19 3 20.96
		300	19 42 46.50
		310	20 22 12.05
		320	21 1 37.60
		330	21 41 3.17
		340	22 20 28.75
		350	22 59 54.33
		360	23 39 19.91
		370	24 18 45.47

TAFEL,
um die Monate in Tage des Jahres zu verwandeln.

Monate	Tage des Jahres c	b
Januar o	0	0
Februar o	31	31
März o	59	60
April o	90	91
Mai o	120	121
Juni o	151	152
Juli o	181	182
August o	212	213
Septbr. o	243	244
October o	273	274
Novbr. o	304	305
Decbr. o	334	335

Jahre.Tage.	Nut.
1871. 0	$0^s 01$
100	0.00
200	0.00
300	0.01
400	0.02
1872. 0	0.02
100	0.04
200	0.07
300	0.11
400	0.16
1873. 0	0.14
100	0.19
200	0.25
300	0.32
400	0.39
1874. 0	0.36
100	0.44
200	0.52
300	0.60
400	0.69
1875. 0	0.66
100	0.75
200	0.84
300	0.93
400	1.03
1876. 0	1.00
100	1.09
200	1.19
300	1.28
400	1.37
1877. 0	1.34
100	1.43
200	1.52
300	1.60
400	1.68
1878. 0	1.65
100	1.73
200	1.80
300	1.87
400	1.92
1879. 0	1.90
100	1.96
200	2.00
300	2.04
400	2.07
1880. 0	2.06
100	2.09
200	2.10
300	2.11
400	2.11
1881. 0	2.11
100	2.10
200	2.08
300	2.06
400	2.02

Jahre.Tage.	Nut.
1882. 0	$2^s 04$
100	2.00
200	1.95
300	1.89
400	1.83
1883. 0	1.85
100	1.78
200	1.71
300	1.62
400	1.54
1884. 0	1.57
100	1.48
200	1.39
300	1.29
400	1.19
1885. 0	1.23
100	1.13
200	1.03
300	0.93
400	0.83
1886. 0	0.87
100	0.77
200	0.67
300	0.58
400	0.50
1887. 0	0.52
100	0.44
200	0.36
300	0.29
400	0.23
1888. 0	0.25
100	0.19
200	0.14
300	0.09
400	0.06
1889. 0	0.07
100	0.04
200	0.02
300	0.00
400	0.00
1890. 0	0.00
100	0.00
200	0.01
300	0.03
400	0.06
1891. 0	0.05
100	0.09
200	0.13
300	0.18
400	0.24

Tafel der mittleren Rectascension der Sonne.

Proportionaltheile der Bewegung.

Tage	39^m25^s58	39^m25^s57	39^m25^s56	39^m25^s55	39^m25^s54	39^m25^s53
1	3^m56^s56	3^m56^s56	3^m56^s56	3^m56^s56	3^m56^s55	3^m56^s55
2	7 53.12	7 53.11	7 53.11	7 53.11	7 53.11	7 53.11
3	11 49.67	11 49.67	11 49.67	11 49.67	11 49.66	11 49.66
4	15 46.23	15 46.23	15 46.22	15 46.22	15 46.22	15 46.21
5	19 42.79	19 42.79	19 42.78	19 42.78	19 42.77	19 42.77
6	23 39.35	23 39.34	23 39.34	23 39.33	23 39.32	23 39.32
7	27 35.91	27 35.90	27 35.89	27 35.89	27 35.88	27 35.87
8	31 32.46	31 32.46	31 32.45	31 32.44	31 32.43	31 32.42
9	35 29.02	35 29.01	35 29.00	35 29.00	35 28.99	35 28.98

Horizontalparallaxe der Sonne, nach *Leverrier*.

Tag	Parallaxe	log. Parallaxe	Tag	Parallaxe	log. Parallaxe
Januar 0	9″10	0.9590	Juli 9	8″80	0.9445
10	9.10	0.9590	19	8.81	0.9450
20	9.09	0.9586	29	8.82	0.9455
30	9.08	0.9581	August 8	8.83	0.9460
Februar 9	9.07	0.9576	18	8.84	0.9465
19	9.05	0.9566	28	8.86	0.9474
März 1	9.02	0.9552	September 7	8.89	0.9489
11	9.00	0.9542	17	8.91	0.9499
21	8.98	0.9533	27	8.94	0.9513
31	8.95	0.9518	October 7	8.96	0.9523
April 10	8.93	0.9509	17	8.99	0.9538
20	8.90	0.9494	27	9.01	0.9547
30	8.86	0.9474	November 6	9.04	0.9562
Mai 10	8.85	0.9469	16	9.06	0.9571
20	8.84	0.9465	26	9.07	0.0576
30	8.82	0.9455	December 6	9.08	0.9581
Juni 9	8.81	0.9450	16	9.09	0.9586
19	8.80	0.9445	26	9.10	0.9590
29	8.80	0.9445	36	9.10	0.9590

Argument: Länge der Sonne = ☉

Arg.	log. a	A	Arg.	Arg.	log. a	A	Arg.
0°180°	1.2731	+0° 0′.-	180° 0°	45°225°	1.2927	+2°28′.-	135°315°
1 181	1.2731	0 5	179 359	46 226	1.2933	2 28	134 314
2 182	1.2732	0 11	178 358	47 227	1.2940	2 27	133 313
3 183	1.2732	0 16	177 357	48 228	1.2946	2 27	132 312
4 184	1.2733	0 22	176 356	49 229	1.2952	2 26	131 311
5 185	1.2734	0 27	175 355	50 230	1.2959	2 25	130 310
6 186	1.2736	0 32	174 354	51 231	1.2965	2 24	129 309
7 187	1.2737	0 37	173 353	52 232	1.2971	2 22	128 308
8 188	1.2739	0 43	172 352	53 233	1.2978	2 21	127 307
9 189	1.2741	0 48	171 351	54 234	1.2984	2 19	126 306
10 190	1.2744	0 53	170 350	55 235	1.2990	2 17	125 305
11 191	1.2746	0 58	169 349	56 236	1.2995	2 15	124 304
12 192	1.2749	1 3	168 348	57 237	1.3001	2 13	123 303
13 193	1.2752	1 8	167 347	58 238	1.3007	2 11	122 302
14 194	1.2755	1 12	166 346	59 239	1.3013	2 8	121 301
15 195	1.2758	1 17	165 345	60 240	1.3018	2 6	120 300
16 196	1.2762	1 22	164 344	61 241	1.3023	2 3	119 299
17 197	1.2766	1 26	163 343	62 242	1.3029	2 0	118 298
18 198	1.2770	1 30	162 342	63 243	1.3034	1 57	117 297
19 199	1.2774	1 34	161 341	64 244	1.3039	1 54	116 296
20 200	1.2779	1 38	160 340	65 245	1.3043	1 50	115 295
21 201	1.2783	1 42	159 339	66 246	1.3048	1 47	114 294
22 202	1.2788	1 46	158 338	67 247	1.3053	1 43	113 293
23 203	1.2793	1 50	157 337	68 248	1.3057	1 40	112 292
24 204	1.2798	1 53	156 336	69 249	1.3061	1 36	111 291
25 205	1.2803	1 57	155 335	70 250	1.3065	1 32	110 290
26 206	1.2808	2 0	154 334	71 251	1.3069	1 28	109 289
27 207	1.2814	2 3	153 333	72 252	1.3073	1 24	108 288
28 208	1.2819	2 6	152 332	73 253	1.3076	1 20	107 287
29 209	1.2825	2 9	151 331	74 254	1.3080	1 16	106 286
30 210	1.2831	2 11	150 330	75 255	1.3083	1 11	105 285
31 211	1.2837	2 13	149 329	76 256	1.3086	1 7	104 284
32 212	1.2843	2 16	148 328	77 257	1.3088	1 3	103 283
33 213	1.2849	2 18	147 327	78 258	1.3091	0 58	102 282
34 214	1.2855	2 20	146 326	79 259	1.3093	0 53	101 281
35 215	1.2862	2 21	145 325	80 260	1.3095	0 49	100 280
36 216	1.2868	2 23	144 324	81 261	1.3097	0 44	99 279
37 217	1.2874	2 24	143 323	82 262	1.3099	0 39	98 278
38 218	1.2881	2 25	142 322	83 263	1.3101	0 34	97 277
39 219	1.2887	2 26	141 321	84 264	1.3102	0 30	96 276
40 220	1.2894	2 27	140 320	85 265	1.3103	0 25	95 275
41 221	1.2900	2 28	139 319	86 266	1.3104	0 20	94 274
42 222	1.2907	2 28	138 318	87 267	1.3105	0 15	93 273
43 223	1.2914	2 28	137 317	88 268	1.3105	0 10	92 272
44 224	1.2920	2 28	136 316	89 269	1.3106	0 5	91 271
45 225	1.2927	+2 28.-	135 315	90 270	1.3106	+0 0.-	90 270
Arg.	log. a	A	Arg.	Arg.	log. a	A	Arg.

LIBRARY OF THE UNIVERSITY

Argumente: Summe und Unterschied der Sonnenlänge und der Declination der Sterne.

Arg.		Arg.	Arg.		Arg.
0°	−4″07+	180°	45°	−2″88+	135°
1	4.07	179	46	2.83	134
2	4.07	178	47	2.78	133
3	4.06	177	48	2.72	132
4	4.06	176	49	2.67	131
5	4.05	175	50	2.62	130
6	4.05	174	51	2.56	129
7	4.04	173	52	2.51	128
8	4.03	172	53	2.45	127
9	4.02	171	54	2.39	126
10	4.01	170	55	2.33	125
11	4.00	169	56	2.28	124
12	3.98	168	57	2.22	123
13	3.97	167	58	2.16	122
14	3.95	166	59	2.10	121
15	3.93	165	60	2.03	120
16	3.91	164	61	1.97	119
17	3.89	163	62	1.91	118
18	3.87	162	63	1.85	117
19	3.85	161	64	1.78	116
20	3.82	160	65	1.72	115
21	3.80	159	66	1.66	114
22	3.77	158	67	1.59	113
23	3.75	157	68	1.52	112
24	3.72	156	69	1.46	111
25	3.69	155	70	1.39	110
26	3.66	154	71	1.33	109
27	3.63	153	72	1.26	108
28	3.59	152	73	1.19	107
29	3.56	151	74	1.12	106
30	3.52	150	75	1.05	105
31	3.49	149	76	0.98	104
32	3.45	148	77	0.92	103
33	3.41	147	78	0.85	102
34	3.37	146	79	0.78	101
35	3.33	145	80	0.71	100
36	3.29	144	81	0.64	99
37	3.25	143	82	0.57	98
38	3.21	142	83	0.50	97
39	3.16	141	84	0.43	96
40	3.12	140	85	0.35	95
41	3.07	139	86	0.28	94
42	3.02	138	87	0.21	93
43	2.98	137	88	0.14	92
44	2.93	136	89	0.07	91
45	−2.88+	135	90	−0.00+	90

Von Argumenten, die > 180° sind, werden 180° subtrahirt und die Vorzeichen umgekehrt.

Argument: Halbe Zwischenzeit.

Arg.	log. A	log. B	Arg.	log. A	log. B	Arg.	log. A	log. B
2h 1′	7.7451	7.6815	2h41′	7.7610	7.6437	3h21′	7.7819	7.5877
2	7.7454	7.6807	42	7.7615	7.6425	22	7.7825	7.5860
3	7.7458	7.6800	43	7.7620	7.6414	23	7.7831	7.5843
4	7.7461	7.6792	44	7.7624	7.6402	24	7.7836	7.5825
5	7.7564	7.6784	45	7.7629	7.6390	25	7.7842	7.5808
6	7.7468	7.6776	46	7.7634	7.6378	26	7.7848	7.5790
7	7.7472	7.6768	47	7.7638	7.6366	27	7.7854	7.5772
8	7.7475	7.6759	48	7.7643	7.6354	28	7.7860	7.5754
9	7.7479	7.6751	49	7.7648	7.6342	29	7.7867	7.5736
10	7.7482	7.6743	50	7.7653	7.6329	30	7.7873	7.5717
11	7.7486	7.6734	51	7.7658	7.6317	31	7.7879	7.5699
12	7.7490	7.6726	52	7.7663	7.6304	32	7.7885	7.5680
13	7.7494	7.6717	53	7.7668	7.6291	33	7.7891	7.5661
14	7.7497	7.6708	54	7.7673	7.6278	34	7.7898	7.5641
15	7.7501	7.6700	55	7.7678	7.6265	35	7.7904	7.5622
16	7.7505	7.6691	56	7.7683	7.6252	36	7.7910	7.5602
17	7.7509	7.6682	57	7.7688	7.6239	37	7.7916	7.5582
18	7.7513	7.6673	58	7.7693	7.6225	38	7.7923	7.5562
19	7.7517	7.6663	59	7.7698	7.6212	39	7.7929	7.5542
20	7.7521	7.6654	3 0	7.7703	7.6198	40	7.7936	7.5522
21	7.7525	7.6645	1	7.7708	7.6184	41	7.7942	7.5501
22	7.7529	7.6635	2	7.7713	7.6170	42	7.7949	7.5480
23	7.7533	7.6626	3	7.7719	7.6156	43	7.7955	7.5459
24	7.7537	7.6616	4	7.7724	7.6142	44	7.7962	7.5437
25	7.7541	7.6606	5	7.7729	7.6127	45	7.7969	7.5416
26	7.7545	7.6597	6	7.7735	7.6113	46	7.7975	7.5394
27	7.7549	7.6587	7	7.7740	7.6098	47	7.7982	7.5372
28	7.7553	7.6577	8	7.7745	7.6083	48	7.7989	7.5350
29	7.7557	7.6567	9	7.7751	7.6068	49	7.7995	7.5327
30	7.7562	7.6556	10	7.7756	7.6053	50	7.8002	7.5304
31	7.7566	7.6546	11	7.7762	7.6038	51	7.8009	7.5281
32	7.7570	7.6536	12	7.7767	7.6023	52	7.8016	7.5258
33	7.7575	7.6525	13	7.7773	7.6007	53	7.8023	7.5234
34	7.7579	7.6514	14	7.7779	7.5991	54	7.8030	7.5211
35	7.7583	7.6504	15	7.7784	7.5975	55	7.8037	7.5186
36	7.7588	7.6493	16	7.7790	7.5959	56	7.8044	7.5162
37	7.7592	7.6482	17	7.7796	7.5943	57	7.8051	7.5137
38	7.7597	7.6471	18	7.7801	7.5927	58	7.8058	7.5112
39	7.7601	7.6460	19	7.7807	7.5910	59	7.8065	7.5087
2 40	7.7606	7.6448	3 20	7.7813	7.5894	4 0	7.8072	7.5062

Argument: Halbe Zwischenzeit.

Arg.	log. A	log. B	Arg.	log. A	log. B	Arg.	log. A	log. B
4h 1′	7.8079	7.5036	4h41′	7.8396	7.3684	5h21′	7.8773	7.1061
2	7.8086	7.5010	42	7.8404	7.3639	22	7.8784	7.0960
3	7.8094	7.4983	43	7.8413	7.3594	23	7.8794	7.0855
4	7.8101	7.4957	44	7.8422	7.3548	24	7.8804	7.0748
5	7.8108	7.4930	45	7.8430	7.3501	25	7.8815	7.0637
6	7.8116	7.4902	46	7.8439	7.3454	26	7.8825	7.0522
7	7.8123	7.4874	47	7.8448	7.3406	27	7.8836	7.0404
8	7.8130	7.4846	48	7.8457	7.3357	28	7.8846	7.0282
9	7.8138	7.4818	49	7.8466	7.3307	29	7.8857	7.0156
10	7.8145	7.4789	50	7.8475	7.3256	30	7.8868	7.0025
11	7.8153	7.4760	51	7.8484	7.3205	31	7.8878	6.9889
12	7.8160	7.4731	52	7.8493	7.3152	32	7.8889	6.9748
13	7.8168	7.4701	53	7.8502	7.3099	33	7.8900	6.9602
14	7.8176	7.4671	54	7.8511	7.3045	34	7.8911	6.9449
15	7.8183	7.4640	55	7.8520	7.2989	35	7.8922	6.9290
16	7.8191	7.4609	56	7.8530	7.2933	36	7.8932	6.9125
17	7.8199	7.4578	57	7.8539	7.2876	37	7.8943	6.8953
18	7.8206	7.4546	58	7.8548	7.2817	38	7.8954	6.8770
19	7.8214	7.4514	59	7.8558	7.2758	39	7.8965	6.8580
20	7.8222	7.4482	5 0	7.8567	7.2697	40	7.8977	6.8379
21	7.8230	7.4449	1	7.8576	7.2635	41	7.8988	6.8168
22	7.8238	7.4415	2	7.8586	7.2572	42	7.8999	6.7945
23	7.8246	7.4381	3	7.8595	7.2507	43	7.9010	6.7709
24	7.8254	7.4347	4	7.8605	7.2442	44	7.9021	6.7457
25	7.8262	7.4312	5	7.8614	7.2374	45	7.9033	6.7189
26	7.8270	7.4277	6	7.8624	7.2306	46	7.9044	6.6901
27	7.8278	7.4241	7	7.8634	7.2236	47	7.9055	6.6591
28	7.8286	7.4205	8	7.8643	7.2164	48	7.9067	6.6255
29	7.8294	7.4168	9	7.8653	7.2091	49	7.9078	6.5889
30	7.8302	7.4131	10	7.8663	7.2016	50	7.9090	6.5487
31	7.8311	7.4093	11	7.8673	7.1940	51	7.9102	6.5041
32	7.8319	7.4055	12	7.8683	7.1861	52	7.9113	6.4541
33	7.8328	7.4016	13	7.8693	7.1781	53	7.9125	6.3973
34	7.8336	7.3977	14	7.8703	7.1699	54	7.9137	6.3316
35	7.8344	7.3937	15	7.8713	7.1615	55	7.9148	6.2536
36	7.8353	7.3876	16	7.8723	7.1529	56	7.9160	6.1579
37	7.8361	7.3855	17	7.8733	7.1440	57	7.9172	6.0341
38	7.8370	7.3813	18	7.8743	7.1349	58	7.9184	5.8593
39	7.8378	7.3771	19	7.8753	7.1256	59	7.9196	5.5594
4 40	7.8387	7.3728	5 20	7.8763	7.1160	6 0	7.9208	— ∞

½ T	log. f	Diff.	½ T	log. f	Diff.	½ T	log. f.	Diff.
6h 1′	0.0024		6h 41′	0.0994		7h 21′	0.1988	
		24			24			26
2	0048		42	1018		22	2014	
		24			25			25
3	0072		43	1043		23	2039	
		25			24			26
4	0097		44	1067		24	2065	
		24			25			25
5	0121		45	1092		25	2090	
		24			24			26
6	0.0145		46	0.1116		26	0.2116	
		24			25			26
7	0169		47	1141		27	2142	
		24			24			25
8	0193		48	1165		28	2167	
		24			25			26
9	0217		49	1190		29	2193	
		24			24			26
10	0241		50	1214		30	2219	
		24			25			26
11	0.0265		51	0.1239		31	0.2245	
		25			25			26
12	0290		52	1264		32	2271	
		24			24			25
13	0314		53	1288		33	2296	
		24			25			26
14	0338		54	1313		34	2322	
		24			25			26
15	0362		55	1338		35	2348	
		24			25			26
16	0.0386		56	0.1363		36	0.2374	
		24			25			26
17	0410		57	1388		37	2400	
		25			24			26
18	0435		58	1412		38	2426	
		24			24			26
19	0459		59	1436		39	2452	
		24			25			26
20	0483		7 0	1461		40	2478	
		24			25			26
21	0.0507		1	0.1486		41	0.2504	
		24			25			26
22	0531		2	1511		42	2530	
		25			25			27
23	0556		3	1536		43	2557	
		24			25			26
24	0580		4	1561		44	2583	
		24			25			26
25	0604		5	1586		45	2609	
		24			25			27
26	0.0628		6	0.1611		46	0.2636	
		25			25			26
27	0653		7	1636		47	2662	
		24			25			27
28	0677		8	1661		48	2689	
		25			25			26
29	0702		9	1686		49	2715	
		24			25			27
30	0726		10	1711		50	2742	
		24			25			27
31	0.0750		11	0.1736		51	0.2769	
		25			25			26
32	0775		12	1761		52	2795	
		24			26			27
33	0799		13	1787		53	2822	
		24			25			26
34	0823		14	1812		54	2848	
		24			25			27
35	0847		15	1837		55	2875	
		25			25			27
36	0.0872		16	0.1862		56	0.2902	
		24			25			27
37	0896		17	1887		57	2929	
		24			26			27
38	0920		18	1913		58	2956	
		25			25			27
39	0945		19	1938		59	2983	
		24			25			27
6 40	0969		7 20	1963		8 0	3010	
		25			25			28

½ T	log. f	Diff.	½ T	log. f	Diff.	½ T	log. f	Diff.
8h 1′	0.3038		8h41′	0.4180		9h21′	0.5476	
		27			30			35
2	3065	27	42	4210	31	22	5511	36
3	3092	27	43	4241	30	23	5547	35
4	3119	28	44	4271	30	24	5582	35
5	3147	27	45	4301	31	25	5617	36
6	0.3174	28	46	0.4332	31	26	0.5653	36
7	3202	28	47	4363	31	27	5689	37
8	3230	27	48	4394	31	28	5726	36
9	3257	28	49	4425	30	29	5762	36
10	3285	28	50	4455	32	30	5798	37
11	0.3313	28	51	0.4487	31	31	0.5835	37
12	3341	27	52	4518	31	32	5872	37
13	3368	28	53	4549	32	33	5909	37
14	3396	28	54	4581	31	34	5946	37
15	3424	29	55	4612	32	35	5983	38
16	0.3453	28	56	0.4644	32	36	0.6021	38
17	3481	28	57	4676	31	37	6059	38
18	3509	28	58	4707	32	38	6097	38
19	3537	29	59	4739	32	39	6135	38
20	3566	28	9 0	4771	33	40	6173	39
21	0.3594	29	1	0.4804	32	41	0.6212	39
22	3623	28	2	4836	33	42	6251	39
23	3651	29	3	4869	32	43	6290	39
24	3680	29	4	4901	33	44	6329	39
25	3709	29	5	4934	33	45	6368	40
26	0.3738	29	6	0.4967	33	46	0.6408	40
27	3767	29	7	5000	33	47	6448	41
28	3796	29	8	5033	33	48	6489	40
29	3825	29	9	5066	33	49	6529	40
30	3854	29	10	5099	34	50	6569	41
31	0.3883	29	11	0.5133	34	51	0.6610	42
32	3912	30	12	5167	33	52	6652	41
33	3942	29	13	5200	34	53	6693	42
34	3971	30	14	5234	34	54	6735	41
35	4001	29	15	5268	35	55	6776	42
36	0.4030	30	16	0.5303	34	56	0.6818	43
37	4060	30	17	5337	35	57	6861	42
38	4090	30	18	5372	34	58	6903	43
39	4120	30	19	5406	35	59	6946	44
8 40	4150	30	9 20	5441	35	10 0	6990	43

½ T	log. f	Diff.	½ T	log. f	Diff.	½ T	log. f	Diff.
10h 1′	0.7033		10h 26′	0.8234		10h 51′	0.9747	
		44			54			70
2	7077	44	27	8288	54	52	9817	71
3	7121	45	28	8342	54	53	9888	72
4	7166	45	29	8396	55	54	0.9960	73
5	7211	45	30	8451	55	55	1.0033	74
6	0.7256	45	31	0.8506	56	56	1.0107	75
7	7301	46	32	8562	57	57	0182	76
8	7347	46	33	8619	57	58	0258	78
9	7393	46	34	8676	58	59	0336	78
10	7439	47	35	8734	58	11 0	0414	80
11	0.7486	47	36	0.8792	59	1	1.0494	80
12	7533	48	37	8851	59	2	0574	82
13	7581	48	38	8910	60	3	0656	84
14	7629	48	39	8970	61	4	0740	85
15	7677	49	40	9031	61	5	0825	86
16	0.7726	49	41	0.9092	63	6	1.0911	88
17	7775	49	42	9155	62	7	0999	89
18	7824	50	43	9217	64	8	1088	91
19	7874	50	44	9281	64	9	1179	92
20	7924	51	45	9345	65	10	1271	94
21	0.7975	51	46	0.9410	66	11	1.1365	96
22	8026	51	47	9476	67	12	1461	98
23	8077	52	48	9543	67	13	1559	100
24	8129	53	49	9610	68	14	1659	102
10 25	8182	52	10 50	9678	69	11 15	1761	

Reduction der Zeit auf das Bessel'sche Jahr.

1850	−	5h	2m	16s.0	1876	+ 11h	49m 46s.9
1851	−	10	51	1.9	1877	+ 6	1 0.8
1852	+	7	20	12.0	1878	+ 0	12 14.6
1853	+	1	31	25.9	1879	− 5	36 31.3
1854	−	4	17	20.3	1880	+ 12	34 42.7
1855	−	10	6	6.2	1881	+ 6	45 56.5
1856	+	8	5	7.9	1882	+ 0	57 10.6
1857	+	2	16	21.7	1883	− 4	51 35.6
1858	−	3	32	24.2	1884	+ 13	19 38.5
1859	−	9	21	10.4	1885	+ 7	30 52.5
1860	+	8	50	3.7	1886	+ 1	42 6.3
1861	+	3	1	17.4	1887	− 4	6 39.6
1862	−	2	47	28.5	1888	+ 14	4 34.3
1863	−	8	36	14.4	1889	+ 6	15 48.2
1864	+	9	34	59.5	1890	+ 2	27 2.0
1865	+	3	46	13.4	1891	− 3	21 43.9
1866	−	2	2	32.8	1892	+ 14	49 30.1
1867	−	7	51	18.7	1893	+ 9	0 44.0
1868	+	10	19	55.3	1894	+ 3	11 58.0
1869	+	4	31	9.1	1895	− 2	36 48.2
1870	−	1	17	36.8	1896	+ 15	44 25.9
1871	−	7	6	23.0	1897	+ 9	45 40.0
1872	+	11	4	51.1	1898	+ 3	56 53.8
1873	+	5	16	4.8	1899	− 1	51 52.1
1874	−	0	32	41.1	1900	− 7	40 38.3
1875	−	6	21	27.0			

Jahre	Epochen
1871	18h38m41s67
1872	18 37 44.37
1873	18 40 43.64
1874	18 39 46.34
1875	18 38 49.05
1876	18 37 51.75
1877	18 40 51.02
1878	18 39 53.72
1879	18 38 56.43
1880	18 37 59.13
1881	18 40 58.40
1882	18 40 1.10
1883	18 39 3.81
1884	18 38 6.51
1885	18 41 5.78
1886	18 40 8.48
1887	18 39 11.19
1888	18 38 13.89
1889	18 41 13.16
1890	18 40 15.87
1891	18 39 18.57

TAFEL,
um die Monate in Tage des Jahres zu verwandeln.

Monate	Tage des Jahres	
	c	b
Januar o	0	0
Februar o	31	31
März o	59	60
April o	90	91
Mai o	120	121
Juni o	151	152
Juli o	181	182
August o	212	213
Septbr. o	243	244
October o	273	274
Novbr. o	304	305
Decbr. o	334	335

Arg. Tage	Bewegung. + Solar-Nut.
0	0h 0m 0s00
10	0 39 25.58
20	1 18 51.15
30	1 58 16.71
40	2 37 42.27
50	3 17 7.81
60	3 56 33.35
70	4 35 58.88
80	5 15 24.41
90	5 54 49.94
100	6 34 15.47
110	7 13 41.00
120	7 53 6.55
130	8 32 32.10
140	9 11 57.66
150	9 51 23.23
160	10 30 48.81
170	11 10 14.38
180	11 49 39.96
190	12 29 5.53
200	13 8 31.10
210	13 47 56.67
220	14 27 22.22
230	15 6 47.77
240	15 46 13.31
250	16 25 38.84
260	17 5 4.37
270	17 44 29.90
280	18 23 55.43
290	19 3 20.96
300	19 42 46.50
310	20 22 12.05
320	21 1 37.60
330	21 41 3.17
340	22 20 28.75
350	22 59 54.33
360	23 39 19.91
370	24 18 45.47

Jahre.Tage.	Nut.
1871. 0	0s01
100	0.00
200	0.00
300	0.01
400	0.02
1872. 0	0.02
100	0.04
200	0.07
300	0.11
400	0.16
1873. 0	0.14
100	0.19
200	0.25
300	0.32
400	0.39
1874. 0	0.36
100	0.44
200	0.52
300	0.60
400	0.69
1875. 0	0.66
100	0.75
200	0.84
300	0.93
400	1.03
1876. 0	1.00
100	1.09
200	1.19
300	1.28
400	1.37
1877. 0	1.34
100	1.43
200	1.52
300	1.60
400	1.68
1878. 0	1.65
100	1.73
200	1.80
300	1.87
400	1.92
1879. 0	1.90
100	1.96
200	2.00
300	2.04
400	2.07
1880. 0	2.06
100	2.09
200	2.10
300	2.11
400	2.11
1881. 0	2.11
100	2.10
200	2.08
300	2.06
400	2.02

Jahre.Tage.	Nut.
1882. 0	2s04
100	2 00
200	1.95
300	1.89
400	1.83
1883. 0	1.85
100	1.78
200	1.71
300	1.62
400	1.54
1884. 0	1.57
100	1.48
200	1.39
300	1.29
400	1.19
1885. 0	1.23
100	1.13
200	1.03
300	0.93
400	0.83
1886. 0	0.87
100	0.77
200	0.67
300	0.58
400	0.50
1887. 0	0.52
100	0.44
200	0.36
300	0.29
400	0.23
1888. 0	0.25
100	0.19
200	0.14
300	0.09
400	0.06
1889. 0	0.07
100	0.04
200	0.02
300	0.00
400	0.00
1890. 0	0.00
100	0.00
200	0.01
300	0.03
400	0.06
1891. 0	0.05
100	0.09
200	0.13
300	0.18
400	0.24

Tafel der mittleren Rectascension der Sonne.

Proportionaltheile der Bewegung.

Tage	$39^m25^s.58$	$39^m25^s.57$	$39^m25^s.56$	$39^m25^s.55$	$39^m25^s.54$	$39^m25^s.53$
1	$3^m56^s.56$	$3^m56^s.56$	$3^m56^s.56$	$3^m56^s.56$	$3^m56^s.55$	$3^m56^s.55$
2	7 53.12	7 53.11	7 53.11	7 53.11	7 53.11	7 53.11
3	11 49.67	11 49.67	11 49.67	11 49.67	11 49.66	11 49.66
4	15 46.23	15 46.23	15 46.22	15 46.22	15 46.22	15 46.21
5	19 42.79	19 42.79	19 42.78	19 42.78	19 42.77	19 42.77
6	23 39.35	23 39.34	23 39.34	23 39.33	23 39.32	23 39.32
7	27 35.91	27 35.90	27 35.89	27 35.89	27 35.88	27 35.87
8	31 32.46	31 32.46	31 32.45	31 32.44	31 32.43	31 32.42
9	35 29.02	35 29.01	35 29.00	35 29.00	35 28.99	35 28.98

Horizontalparallaxe der Sonne, nach *Leverrier*.

Tag	Parallaxe	log. Parallaxe	Tag	Parallaxe	log. Parallaxe
Januar 0	9".10	0.9590	Juli 9	8".80	0.9445
10	9.10	0.9590	19	8.81	0.9450
20	9.09	0.9586	29	8.82	0.9455
30	9.08	0.9581	August 8	8.83	0.9460
Februar 9	9.07	0.9576	18	8.84	0.9465
19	9.05	0.9566	28	8.86	0.9474
März 1	9.02	0.9552	September 7	8.89	0.9489
11	9.00	0.9542	17	8.91	0.9499
21	8.98	0.9533	27	8.94	0.9513
31	8.95	0.9518	October 7	8.96	0.9523
April 10	8.93	0.9509	17	8.99	0.9538
20	8.90	0.9494	27	9.01	0.9547
30	8.86	0.9474	November 6	9.04	0.9562
Mai 10	8.85	0.9469	16	9.06	0.9571
20	8.84	0.9465	26	9.07	0.0576
30	8.82	0.9455	December 6	9.08	0.9581
Juni 9	8.81	0.9450	16	9.09	0.9586
19	8.80	0.9445	26	9.10	0.9590
29	8.80	0.9445	36	9.10	0.9590

Argument: Länge der Sonne = ☉

Arg.	log. a	A	Arg.	Arg.	log. a	A	Arg.
0°180°	1.2731	+0° 0′.-	180° 0°	45°225°	1.2927	+2°28′.-	135°315°
1 181	1.2731	0 5	179 359	46 226	1.2933	2 28	134 314
2 182	1.2732	0 11	178 358	47 227	1.2940	2 27	133 313
3 183	1.2732	0 16	177 357	48 228	1.2946	2 27	132 312
4 184	1.2733	0 22	176 356	49 229	1.2952	2 26	131 311
5 185	1.2734	0 27	175 355	50 230	1.2959	2 25	130 310
6 186	1.2736	0 32	174 354	51 231	1.2965	2 24	129 309
7 187	1.2737	0 37	173 353	52 232	1.2971	2 22	128 308
8 188	1.2739	0 43	172 352	53 233	1.2978	2 21	127 307
9 189	1.2741	0 48	171 351	54 234	1.2984	2 19	126 306
10 190	1.2744	0 53	170 350	55 235	1.2990	2 17	125 305
11 191	1.2746	0 58	169 349	56 236	1.2995	2 15	124 304
12 192	1.2749	1 3	168 348	57 237	1.3001	2 13	123 303
13 193	1.2752	1 8	167 347	58 238	1.3007	2 11	122 302
14 194	1.2755	1 12	166 346	59 239	1.3013	2 8	121 301
15 195	1.2758	1 17	165 345	60 240	1.3018	2 6	120 300
16 196	1.2762	1 22	164 344	61 241	1.3023	2 3	119 299
17 197	1.2766	1 26	163 343	62 242	1.3029	2 0	118 298
18 198	1.2770	1 30	162 342	63 243	1.3034	1 57	117 297
19 199	1.2774	1 34	161 341	64 244	1.3039	1 54	116 296
20 200	1.2779	1 38	160 340	65 245	1.3043	1 50	115 295
21 201	1.2783	1 42	159 339	66 246	1.3048	1 47	114 294
22 202	1.2788	1 46	158 338	67 247	1.3053	1 43	113 293
23 203	1.2793	1 50	157 337	68 248	1.3057	1 40	112 292
24 204	1.2798	1 53	156 336	69 249	1.3061	1 36	111 291
25 205	1.2803	1 57	155 335	70 250	1.3065	1 32	110 290
26 206	1.2808	2 0	154 334	71 251	1.3069	1 28	109 289
27 207	1.2814	2 3	153 333	72 252	1.3073	1 24	108 288
28 208	1.2819	2 6	152 332	73 253	1.3076	1 20	107 287
29 209	1.2825	2 9	151 331	74 254	1.3080	1 16	106 286
30 210	1.2831	2 11	150 330	75 255	1.3083	1 11	105 285
31 211	1.2837	2 13	149 329	76 256	1.3086	1 7	104 284
32 212	1.2843	2 16	148 328	77 257	1.3088	1 3	103 283
33 213	1.2849	2 18	147 327	78 258	1.3091	0 58	102 282
34 214	1.2855	2 20	146 326	79 259	1.3093	0 53	101 281
35 215	1.2862	2 21	145 325	80 260	1.3095	0 49	100 280
36 216	1.2868	2 23	144 324	81 261	1.3097	0 44	99 279
37 217	1.2874	2 24	143 323	82 262	1.3099	0 39	98 278
38 218	1.2881	2 25	142 322	83 263	1.3101	0 34	97 277
39 219	1.2887	2 26	141 321	84 264	1.3102	0 30	96 276
40 220	1.2894	2 27	140 320	85 265	1.3103	0 25	95 275
41 221	1.2900	2 28	139 319	86 266	1.3104	0 20	94 274
42 222	1.2907	2 28	138 318	87 267	1.3105	0 15	93 273
43 223	1.2914	2 28	137 317	88 268	1.3105	0 10	92 272
44 224	1.2920	2 28	136 316	89 269	1.3106	0 5	91 271
45 225	1.2927	+2 28.-	135 315	90 270	1.3106	+0 0.-	90 270
Arg.	log. a	A	Arg.	Arg.	log. a	A	Arg.

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Argumente: Summe und Unterschied der Sonnenlänge und der Declination der Sterne.

Arg.		Arg.	Arg.		Arg.
0°	−4″07+	180°	45°	−2″88+	135°
1	4.07	179	46	2.83	134
2	4.07	178	47	2.78	133
3	4.06	177	48	2.72	132
4	4.06	176	49	2.67	131
5	4.05	175	50	2.62	130
6	4.05	174	51	2.56	129
7	4.04	173	52	2.51	128
8	4.03	172	53	2.45	127
9	4.02	171	54	2.39	126
10	4.01	170	55	2.33	125
11	4.00	169	56	2.28	124
12	3.98	168	57	2.22	123
13	3.97	167	58	2.16	122
14	3.95	166	59	2.10	121
15	3.93	165	60	2.03	120
16	3.91	164	61	1.97	119
17	3.89	163	62	1.91	118
18	3.87	162	63	1.85	117
19	3.85	161	64	1.78	116
20	3.82	160	65	1.72	115
21	3.80	159	66	1.66	114
22	3.77	158	67	1.59	113
23	3.75	157	68	1.52	112
24	3.72	156	69	1.46	111
25	3.69	155	70	1.39	110
26	3.66	154	71	1.33	109
27	3.63	153	72	1.26	108
28	3.59	152	73	1.19	107
29	3.56	151	74	1.12	106
30	3.52	150	75	1.05	105
31	3.49	149	76	0.98	104
32	3.45	148	77	0.92	103
33	3.41	147	78	0.85	102
34	3.37	146	79	0.78	101
35	3.33	145	80	0.71	100
36	3.29	144	81	0.64	99
37	3.25	143	82	0.57	98
38	3.21	142	83	0.50	97
39	3.16	141	84	0.43	96
40	3.12	140	85	0.35	95
41	3.07	139	86	0.28	94
42	3.02	138	87	0.21	93
43	2.98	137	88	0.14	92
44	2.93	136	89	0.07	91
45	−2.88+	135	90	−0.00+	90

Von Argumenten, die > 180° sind, werden 180° subtrahirt und die Vorzeichen umgekehrt.

Argument: Länge des aufsteigenden Knotens der Mondbahn = ☊

Arg.		log. b	B	c	Arg.	
0°	180°	0.9649	0° 0′	0″00	180°	0°
1	181	0.9649	0 15	0.28	179	359
2	182	0.9648	0 31	0.55	178	358
3	183	0.9646	0 46	0.83	177	357
4	184	0.9644	1 1	1.10	176	356
5	185	0.9642	1 16	1.38	175	355
6	186	0.9638	1 32	1.65	174	354
7	187	0.9634	1 47	1.93	173	353
8	188	0.9630	2 2	2.20	172	352
9	189	0.9625	2 17	2.48	171	351
10	190	0.9620	2 31	2.75	170	350
11	191	0.9614	2 46	3.02	169	349
12	192	0.9607	3 0	3.29	168	348
13	193	0.9599	3 15	3.56	167	347
14	194	0.9592	3 29	3.83	166	346
15	195	0.9583	3 43	4.10	165	345
16	196	0.9574	3 57	4.36	164	344
17	197	0.9565	4 11	4.63	163	343
18	198	0.9555	4 24	4.89	162	342
19	199	0.9544	4 37	5.15	161	341
20	200	0.9533	4 50	5.41	160	340
21	201	0.9521	5 3	5.67	159	339
22	202	0.9509	5 16	5.93	158	338
23	203	0.9496	5 28	6.18	157	337
24	204	0.9483	5 40	6.44	156	336
25	205	0.9469	5 51	6.69	155	335
26	206	0.9455	6 3	6.94	154	334
27	207	0.9440	6 14	7.18	153	333
28	208	0.9424	6 24	7.43	152	332
29	209	0.9409	6 35	7.67	151	331
30	210	0.9392	6 44	7.91	150	330
31	211	0.9376	6 54	8.15	149	329
32	212	0.9359	7 3	8.39	148	328
33	213	0.9341	7 12	8.62	147	327
34	214	0.9323	7 20	8.85	146	326
35	215	0.9305	7 28	9.08	145	325
36	216	0.9286	7 35	9.30	144	324
37	217	0.9267	7 42	9.52	143	323
38	218	0.9247	7 49	9.74	142	322
39	219	0.9227	7 55	9.96	141	321
40	220	0.9207	8 0	10.17	140	320
41	221	0.9186	8 5	10.38	139	319
42	222	0.9166	8 10	10.59	138	318
43	223	0.6144	8 14	10.79	137	317
44	224	0.9123	8 17	10.99	136	316
45	225	0.9102	8 20	11.19	135	315

						B	c
b ist positiv.							
Für Argumente zwischen	0°	und	90°	ist		negativ	negativ
„	90	„	180	„		positiv	negativ
„	180	„	270	„		negativ	positiv
„	270	„	360	„		positiv	positiv.

Argument: Länge des aufsteigenden Knotens der Mondbahn = ☊

Arg.		log. b	B	c	Arg.	
45°	225°	0.9102	8°20′	11″19	135°	315°
46	226	0.9080	8 22	11.38	134	314
47	227	0.9058	8 24	11.57	133	313
48	228	0.9035	8 25	11.76	132	312
49	229	0.9013	8 25	11.94	131	311
50	230	0.8990	8 25	12.12	130	310
51	231	0.8968	8 24	12.30	129	309
52	232	0.8945	8 23	12.47	128	308
53	233	0.8923	8 21	12.64	127	307
54	234	0.8900	8 18	12.80	126	306
55	235	0.8877	8 15	12.96	125	305
56	236	0.8855	8 11	13.12	124	304
57	237	0.8832	8 6	13.27	123	303
58	238	0.8810	8 0	13.42	122	302
59	239	0.8787	7 54	13.56	121	301
60	240	0.8765	7 48	13.70	120	300
61	241	0.8743	7 40	13.84	119	299
62	242	0.8722	7 32	13.97	118	298
63	243	0.8701	7 23	14.10	117	297
64	244	0.8680	7 14	14.22	116	296
65	245	0.8659	7 4	14.34	115	295
66	246	0.8639	6 53	14.46	114	294
67	247	0.8619	6 41	14.57	113	293
68	248	0.8600	6 29	14.67	112	292
69	249	0.8581	6 17	14.77	111	291
70	250	0.8563	6 3	14.87	110	290
71	251	0.8545	5 49	14.96	109	289
72	252	0.8528	5 35	15.05	108	288
73	253	0.8512	5 20	15.13	107	287
74	254	0.8496	5 4	15.21	106	286
75	255	0.8481	4 48	15.28	105	285
76	256	0.8467	4 31	15.35	104	284
77	257	0.8454	4 14	15.42	103	283
78	258	0.8442	3 56	15.48	102	282
79	259	0.8430	3 38	15.53	101	281
80	260	0.8419	3 19	15.58	100	280
81	261	0.8410	3 1	15.63	99	279
82	262	0.8401	2 41	15.67	98	278
83	263	0.8393	2 22	15.71	97	277
84	264	0.8386	2 2	15.74	96	276
85	265	0.8381	1 42	15.76	95	275
86	266	0.8376	1 22	15.78	94	274
87	267	0.8372	1 2	15.80	93	273
88	268	0.8370	0 41	15.81	92	272
89	269	0.8368	0 21	15.82	91	271
90	270	0.8368	0 0	15.82	90	270

b ist positiv.							*B*	*c*
Für Argumente zwischen	0°	und	90°	ist			negativ	negativ
„	90	„	180	„			positiv	negativ
„	180	„	270	„			negativ	positiv
„	270	„	360	„			positiv	positiv.

Argument: Doppelte Länge der Sonne = 2 ☉

Arg.		log. f	F	g	Arg.	
0°	180°	9.7410	0° 0′	0″00	180°	0°
2	182	9.7409	0 10	0.04	178	358
4	184	9.7408	0 20	0.08	176	356
6	186	9.7406	0 30	0.12	174	354
8	188	9.7403	0 39	0.16	172	352
10	190	9.7399	0 49	0.20	170	350
12	192	9.7395	0 58	0.24	168	348
14	194	9.7389	1 7	0.28	166	346
16	196	9.7383	1 16	0.32	164	344
18	198	9.7376	1 24	0.36	162	342
20	200	9.7369	1 32	0.40	160	340
22	202	9.7361	1 40	0.44	158	338
24	204	9.7352	1 47	0.47	156	336
26	206	9.7342	1 54	0.51	154	334
28	208	9.7332	2 0	0.55	152	332
30	210	9.7322	2 5	0.58	150	330
32	212	9.7311	2 10	0.62	148	328
34	214	9.7299	2 15	0.65	146	326
36	216	9.7287	2 19	0.68	144	324
38	218	9.7275	2 22	0.72	142	322
40	220	9.7263	2 24	0.75	140	320
42	222	9.7250	2 26	0.78	138	318
44	224	9.7237	2 28	0.81	136	316
46	226	9.7224	2 28	0.84	134	314
48	228	9.7211	2 28	0.87	132	312
50	230	9.7198	2 27	0.89	130	310
52	232	9.7185	2 25	0.92	128	308
54	234	9.7172	2 22	0.94	126	306
56	236	9.7159	2 19	0.97	124	304
58	238	9.7147	2 15	0.99	122	302
60	240	9.7135	2 11	1.01	120	300
62	242	9.7124	2 6	1.03	118	298
64	244	9.7113	2 0	1.05	116	296
66	246	9.7102	1 53	1.06	114	294
68	248	9.7092	1 46	1.08	112	292
70	250	9.7083	1 38	1.09	110	290
72	252	9.7074	1 30	1.11	108	288
74	254	9.7066	1 21	1.12	106	286
76	256	9.7059	1 12	1.13	104	284
78	258	9.7053	1 3	1.14	102	282
80	260	9.7048	0 53	1.15	100	280
82	262	9.7043	0 43	1.15	98	278
84	264	9.7040	0 32	1.16	96	276
86	266	9.7037	0 22	1.16	94	274
88	268	9.7036	0 11	1.16	92	272
90	270	9.7035	0 0	1.16	90	270

							F	g
f ist positiv.								
Für Argumente zwischen		0°	und	90°	ist	negativ	negativ	
„		90	„	180	„	positiv	negativ	
„		180	„	270	„	negativ	positiv	
„		270	„	360	„	positiv	positiv.	

Arg.	$\frac{x(x-1)}{4}$	Diff.	$\frac{x(x-1)(x-\frac{1}{2})}{6}$	$\frac{(x+1)x(x-1)(x-2)}{48}$	Arg.
	—		+	+	
0.00	0.00000	248	+ 0.0000 —	0.0000	1.00
0.01	0.00248	242	0.0008	0.0004	0.99
0.02	0.00490	238	0.0016	0.0008	0.98
0.03	0.00728	232	0.0023	0.0012	0.97
0.04	0.00960	228	0.0029	0.0016	0.96
0.05	0.01188	222	0.0036	0.0020	0.95
0.06	0.01410	218	0.0041	0.0024	0.94
0.07	0.01628	212	0.0047	0.0028	0.93
0.08	0.01840	208	0.0052	0.0032	0.92
0.09	0.02048	202	0.0056	0.0036	0.91
0.10	0.02250	198	0.0060	0.0039	0.90
0.11	0.02448	192	0.0064	0.0043	0.89
0.12	0.02640	188	0.0067	0.0046	0.88
0.13	0.02828	182	0.0070	0.0050	0.87
0.14	0.03010	178	0.0072	0.0053	0.86
0.15	0.03188	172	0.0074	0.0057	0.85
0.16	0.03360	168	0.0076	0.0060	0.84
0.17	0.03528	162	0.0078	0.0063	0.83
0.18	0.03690	158	0.0079	0.0066	0.82
0.19	0.03848	152	0.0080	0.0069	0.81
0.20	0.04000	148	0.0080	0.0072	0.80
0.21	0.04148	142	0.0080	0.0075	0.79
0.22	0.04290	138	0.0080	0.0078	0.78
0.23	0.04428	132	0.0080	0.0080	0.77
0.24	0.04560	128	0.0079	0.0083	0.76
0.25	0.04688	122	0.0078	0.0085	0.75
0.26	0.04810	118	0.0077	0.0088	0.74
0.27	0.04928	112	0.0076	0.0090	0.73
0.28	0.05040	108	0.0074	0.0092	0.72
0.29	0.05148	102	0.0072	0.0095	0.71
0.30	0.05250	98	0.0070	0.0097	0.70
0.31	0.05348	92	0.0068	0.0099	0.69
0.32	0.05440	88	0.0065	0.0101	0.68
0.33	0.05528	82	0.0063	0.0102	0.67
0.34	0.05610	78	0.0060	0.0104	0.66
0.35	0.05688	72	0.0057	0.0106	0.65
0.36	0.05760	68	0.0054	0.0107	0.64
0.37	0.05828	62	0.0051	0.0108	0.63
0.38	0.05890	58	0.0047	0.0110	0.62
0.39	0.05948	52	0.0044	0.0111	0.61
0.40	0.06000	48	0.0040	0.0112	0.60
0.41	0.06048	42	0.0036	0.0113	0.59
0.42	0.06090	38	0.0032	0.0114	0.58
0.43	0.06128	32	0.0029	0.0115	0.57
0.44	0.06160	28	0.0025	0.0115	0.56
0.45	0.06188	22	0.0021	0.0116	0.55
0.46	0.06210	18	0.9017	0.0116	0.54
0.47	0.06228	12	0.0012	0.0117	0.53
0.48	0.06240	8	0.0008	0.0117	0.52
0.49	0.06248	2	0.0004	0.0117	0.51
0.50	0.06250		+ 0.0000 —	0.0117	0.50
	—			+	

Arg.	$\frac{x^2}{2}$	Diff.	$\frac{x(x^2-1)}{12}$	Diff.	$\frac{x^2(x^2-1)}{24}$	$\frac{x(x^2-1)(x^2-4)}{240}$
±0.00	+0.00000	+5	∓0.0000	∓ 8	−0.0000	+0.0000
0.01	0.00005	15	0.0008	9	0.0000	−0.0001
0.02	0.00020	25	0.0017	8	0.0000	0.0003
0.03	0.00045	35	0.0025	8	0.0000	0.0005
0.04	0.00080	45	0.0033	9	0.0001	0.0007
0.05	0.00125	55	0.0042	8	0.0001	0.0008
0.06	0.00180	65	0.0050	8	0.0001	0.0010
0.07	0.00245	75	0.0058	8	0.0002	0.0011
0.08	0.00320	85	0.0066	8	0.0003	0.0013
0.09	0.00405	95	0.0074	9	0.0003	0.0014
0.10	0.00500	105	0.0083	8	0.0004	0.0016
0.11	0.00605	115	0.0091	8	0.0005	0.0018
0.12	0.00720	125	0.0099	8	0.0006	0.0020
0.13	0.00845	135	0.0107	7	0.0007	0.0021
0.14	0.00980	145	0.0114	8	0.0008	0.0023
0.15	0.01125	155	0.0122	8	0.0009	0.0024
0.16	0.01280	165	0.0130	8	0.0010	0.0026
0.17	0.01445	175	0.0138	7	0.0012	0.0027
0.18	0.01620	185	0.0145	8	0.0013	0.0029
0.19	0.01805	195	0.0153	7	0.0014	0.0030
0.20	0.02000	205	0.0160	7	0.0016	0.0032
0.21	0.02205	215	0.0167	7	0.0018	0.0033
0.22	0.02420	225	0.0174	8	0.0019	0.0034
0.23	0.02645	235	0.0182	6	0.0021	0.0035
0.24	0.02880	245	0.0188	7	0.0023	0.0037
0.25	0.02625	255	0.0195	7	0.0024	0.0038
0.26	0.03380	265	0.0202	7	0.0026	0.0039
0.27	0.03645	275	0.0209	6	0.0028	0.0041
0.28	0.03920	285	0.0215	6	0.0030	0.0042
0.29	0.04205	295	0.0221	7	0.0032	0.0044
0.30	0.04500	305	0.0228	6	0.0034	0.0045
0.31	0.04805	315	0.0234	5	0.0036	0.0046
0.32	0.05120	325	0.0239	6	0.0038	0.0047
0.33	0.05445	235	0.0245	6	0.0040	0.0048
0.34	0.05780	345	0.0251	5	0.0043	0.0049
0.35	0.06125	355	0.0256	5	0.0045	0.0050
0.36	0.06480	365	0.0261	5	0.0047	0.0051
0.37	0.06845	375	0.0266	5	0.0049	0.0052
0.38	0.07220	385	0.0271	5	0.0051	0.0053
0.39	0.07605	395	0.0276	5	0.0054	0.0054
0.40	0.08000	405	0.0280	4	0.0056	0.0054
0.41	0.08405	415	0.0284	4	0.0058	0.0055
0.42	0.08820	425	0.0288	4	0.0061	0.0055
0.43	0.09245	435	0.0292	4	0.0063	0.0056
0.44	0.09680	445	0.0296	4	0.0065	0.0056
0.45	0.10125	455	0.0299	3	0.0067	0.0057
0.46	0.10580	465	0.0302	3	0.0070	0.0057
0.47	0.11045	475	0.0305	3	0.0072	0.0058
0.48	0.11520	485	0.0308	3	0.0074	0.0058
0.49	0.12005	495	0.0310	2	0.0076	0.0058
0.50	0.12500		0.0313	3	0.0078	0.0058

Arg.	$\frac{x^2}{2}$	Diff.	$\frac{x(x^2-1)}{12}$	Diff.	$\frac{x^2(x^2-1)}{24}$	$\frac{x(x^2-1)(x^2-4)}{240}$
±0.50	+0.12500	+505	∓0.0313	∓ 1	−0.0078	+0.0058
0.51	0.13005	515	0.0314	2	0.0080	−0.0059
0.52	0.13520	525	0.0316	2	0.0082	0.0059
0.53	0.14045	535	0.0318	1	0.0084	0.0059
0.54	0.14580	545	0.0319	1	0.0086	0.0059
0.55	0.15125	555	0.0320	0	0.0088	0.0059
0.56	0.15680	565	0.0320	1	0.0090	0.0059
0.57	0.16245	575	0.0321	0	0.0091	0.0059
0.58	0.16820	585	0.0321	0	0.0093	0.0059
0.59	0.17405	595	0.0321	± 1	0.0095	0.0059
0.60	0.18000	605	0.0320	1	0.0096	0.0059
0.61	0.18605	615	0.0319	1	0.0097	0.0058
0.62	0.19220	625	0.0318	1	0.0099	0.0058
0.63	0.19845	635	0.0317	2	0.0100	0.0058
0.64	0.20480	645	0.0315	2	0.0101	0.0057
0.65	0.21125	655	0.0313	3	0.0102	0.0057
0.66	0.21780	665	0.0310	2	0.0102	0.0056
0.67	0.22445	675	0.0308	3	0.0103	0.0055
0.68	0.23120	685	0.0305	4	0.0104	0.0054
0.69	0.23805	695	0.0301	3	0.0104	0.0053
0.70	0.24500	705	0.0298	5	0.0104	0.0052
0.71	0.25205	715	0.0293	4	0.0104	0.0051
0.72	0.25920	725	0.0289	5	0.0104	0.0050
0.73	0.26645	735	0.0284	5	0.0104	0.0049
0.74	0.27380	745	0.0279	6	0.0103	0.0048
0.75	0.28125	755	0.0273	5	0.0103	0.0047
0.76	0.28880	765	0.0268	7	0.0102	0.0045
0.77	0.29645	775	0.0261	6	0.0101	0.0044
0.78	0.30420	785	0.0255	8	0.0099	0.0043
0.79	0.31205	795	0.0247	7	0.0098	0.0042
0.80	0.32000	805	0.0240	9	0.0096	0.0040
0.81	0.32805	815	0.0231	7	0.0094	0.0039
0.82	0.33620	825	0.0224	9	0.0092	0.0037
0.83	0.34445	835	0.0215	9	0.0089	0.0036
0.84	0.35280	845	0.0206	9	0.0087	0.0034
0.85	0.36125	855	0.0197	10	0.0084	0.0033
0.86	0.36980	865	0.0187	11	0.0080	0.0031
0.87	0.37845	875	0.0176	11	0.0077	0.0029
0.88	0.38720	885	0.0165	11	0.0073	0.0027
0.89	0.39605	895	0.0154	11	0.0069	0.0025
0.90	0.40500	905	0.0143	13	0.0064	0.0023
0.91	0.41405	915	0.0130	12	0.0059	0.0021
0.92	0.42320	925	0.0118	13	0.0054	0.0019
0.93	0.43245	935	0.0105	14	0.0049	0.0017
0.94	0.44180	945	0.0091	14	0.0043	0.0015
0.95	0.45125	955	0.0077	14	0.0037	0.0013
0.96	0.46080	965	0.0063	15	0.0030	0.0010
0.97	0.47045	975	0.0048	16	0.0023	0.0008
0.98	0.48020	985	0.0032	16	0.0016	0.0005
0.99	0.49005	995	0.0016	16	0.0008	0.0002
1.00	0.50000		0.0000		0.0000	0.0000

0°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.00000	1.00000	0.00000	infinit.	1.00000	infinit.	60
1	0.00029	1.00000	0.00029	3437.74667	1.00000	3437.74682	59
2	0.00058	1.00000	0.00058	1718.87319	1.00000	1718.87348	58
3	0.00087	1.00000	0.00087	1145.91530	1.00000	1145.91574	57
4	0.00116	1.00000	0.00116	859.43630	1.00000	859.43689	56
5	0.00145	1.00000	0.00145	687.54887	1.00000	687.54960	55
6	0.00175	1.00000	0.00175	572.95721	1.00000	572.95809	54
7	0.00204	1.00000	0.00204	491.10600	1.00000	491.10702	53
8	0.00233	1.00000	0.00233	429.71757	1.00000	429.71873	52
9	0.00262	1.00000	0.00262	381.97099	1.00000	381.97230	51
10	0.00291	1.00000	0.00291	343.77371	1.00000	343.77516	50
11	0.00320	0.99999	0.00320	312.52137	1.00001	312.52297	49
12	0.00349	0.99999	0.00349	286.47773	1.00001	286.47948	48
13	0.00378	0.99999	0.00378	264.44080	1.00001	264.44269	47
14	0.00407	0.99999	0.00407	245.55198	1.00001	245.55402	46
15	0.00436	0.99999	0.00436	229.18166	1.00001	229.18385	45
16	0.00465	0.99999	0.00465	214.85762	1.00001	214.85995	44
17	0.00495	0.99999	0.00495	202.21875	1.00001	202.22122	43
18	0.00524	0.99999	0.00524	190.98419	1.00001	190.98680	42
19	0.00553	0.99998	0.00553	180.93220	1.00002	180.93496	41
20	0.00582	0.99998	0.00582	171.88540	1.00002	171.88831	40
21	0.00611	0.99998	0.00611	163.70019	1.00002	163.70325	39
22	0.00640	0.99998	0.00640	156.25908	1.00002	156.26228	38
23	0.00669	0.99998	0.00669	149.46502	1.00002	149.46837	37
24	0.00698	0.99998	0.00698	143.23712	1.00002	143.24061	36
25	0.00727	0.99997	0.00727	137.50745	1.00003	137.51108	35
26	0.00756	0.99997	0.00756	132.21851	1.00003	132.22229	34
27	0.00785	0.99997	0.00785	127.32134	1.00003	127.32526	33
28	0.00814	0.99997	0.00815	122.77396	1.00003	122.77803	32
29	0.00844	0.99996	0.00844	118.54018	1.00004	118.54440	31
30	0.00873	0.99996	0.00873	114.58865	1.00004	114.59301	30
31	0.00902	0.99996	0.00902	110.89265	1.00004	110.89656	29
32	0.00931	0.99996	0.00931	107.42648	1.00004	107.43114	28
33	0.00960	0.99995	0.00960	104.17094	1.00005	104.17574	27
34	0.00989	0.99995	0.00989	101.10690	1.00005	101.11185	26
35	0.01018	0.99995	0.01018	98.21794	1.00005	98.22303	25
36	0.01047	0.99995	0.01047	95.48948	1.00005	95.49471	24
37	0.01076	0.99994	0.01076	92.90849	1.00006	92.91387	23
38	0.01105	0.99994	0.01105	90.46334	1.00006	90.46886	22
39	0.01134	0.99994	0.01135	88.14357	1.00006	88.14924	21
40	0.01164	0.99993	0.01164	85.93979	1.00007	85.94561	20
41	0.01193	0.99993	0.01193	83.84351	1.00007	83.84947	19
42	0.01222	0.99993	0.01222	81.84704	1.00007	81.85315	18
43	0.01251	0.99992	0.01251	79.94343	1.00008	79.94968	17
44	0.01280	0.99992	0.01280	78.12634	1.00008	78.13274	16
45	0.01309	0.99991	0.01309	76.39001	1.00009	76.39655	15
46	0.01338	0.99991	0.01338	74.72917	1.00009	74.73586	14
47	0.01367	0.99991	0.01367	73.13899	1.00009	73.14583	13
48	0.01396	0.99990	0.01396	71.61507	1.00010	71.62205	12
49	0.01425	0.99990	0.01425	70.15335	1.00010	70.16047	11
50	0.01454	0.99989	0.01455	68.75009	1.00011	68.75736	10
51	0.01483	0.99989	0.01484	67.40185	1.00011	67.40927	9
52	0.01513	0.99989	0.01513	66.10547	1.00011	66.11304	8
53	0.01542	0.99988	0.01542	64.85801	1.00012	64.86572	7
54	0.01571	0.99988	0.01571	63.65674	1.00012	63.66460	6
55	0.01600	0.99987	0.01600	62.49915	1.00013	62.50715	5
56	0.01629	0.99987	0.01629	61.38291	1.00013	61.39105	4
57	0.01658	0.99986	0.01658	60.30582	1.00014	60.31411	3
58	0.01687	0.99986	0.01687	59.26587	1.00014	59.27431	2
59	0.01716	0.99985	0.01716	58.26117	1.00015	58.26975	1
60	0.01745	0.99985	0.01746	57.28996	1.00015	57.29869	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

1 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.01745	0.99985	0.01746	57.28996	1.00015	57.29869	60
1	0.01774	0.99984	0.01775	56.35059	1.00016	56.35956	59
2	0.01803	0.99984	0.01804	55.44152	1.00016	55.45053	58
3	0.01832	0.99983	0.01833	54.56130	1.00017	54.47046	57
4	0.01862	0.99983	0.01862	53.70859	1.00017	53.71790	56
5	0.01891	0.99982	0.01891	52.88211	1.00018	52.89156	55
6	0.01920	0.99982	0.01920	52.08067	1.00018	52.09027	54
7	0.01949	0.99981	0.01949	51.30316	1.00019	51.31290	53
8	0.01978	0.99980	0.01978	50.54851	1.00020	50.55840	52
9	0.02007	0.99980	0.02007	49.81573	1.00020	49.82576	51
10	0.02036	0.99979	0.02036	49.10388	1.00021	49.11406	50
11	0.02065	0.99979	0.02066	48.41208	1.00021	48.42241	49
12	0.02094	0.99978	0.02095	47.73950	1.00022	47.74997	48
13	0.02123	0.99977	0.02124	47.08534	1.00023	47.09596	47
14	0.02152	0.99977	0.02153	46.44886	1.00023	46.45963	46
15	0.02181	0.99976	0.02182	45.82935	1.00024	45.84026	45
16	0.02211	0.99976	0.02211	45.22614	1.00024	45.23719	44
17	0.02240	0.99975	0.02240	44.63860	1.00025	44.64980	43
18	0.02269	0.99974	0.02269	44.06611	1.00026	44.07746	42
19	0.02298	0.99974	0.02298	43.50812	1.00026	43.51961	41
20	0.02327	0.99973	0.02328	42.96408	1.00027	42.97571	40
21	0.02356	0.99972	0.02357	42.43346	1.00028	42.44525	39
22	0.02385	0.99972	0.02386	41.91579	1.00028	41.92772	38
23	0.02414	0.99971	0.02415	41.41059	1.00029	41.42266	37
24	0.02443	0.99970	0.02444	40.91741	1.00030	40.92963	36
25	0.02472	0.99969	0.02473	40.43584	1.00031	40.44820	35
26	0.02501	0.99969	0.02502	39.96546	1.00031	39.97797	34
27	0.02530	0.99968	0.02531	39.50589	1.00032	39.51855	33
28	0.02560	0.99967	0.02560	39.05677	1.00033	39.06957	32
29	0.02589	0.99966	0.02589	38.61774	1.00034	38.63068	31
30	0.02618	0.99966	0.02619	38.18846	1.00034	38.20155	30
31	0.02647	0.99965	0.02648	37.76861	1.00035	37.78185	29
32	0.02676	0.99964	0.02677	37.35789	1.00036	37.37127	28
33	0.02705	0.99963	0.02706	36.95600	1.00037	36.96953	27
34	0.02734	0.99963	0.02735	36.56266	1.00037	36.57633	26
35	0.02763	0.99962	0.02764	36.17760	1.00038	36.19141	25
36	0.02792	0.99961	0.02793	35.80055	1.00039	35.81452	24
37	0.02821	0.99960	0.02822	35.43128	1.00040	35.44539	23
38	0.02850	0.99959	0.02851	35.06955	1.00041	35.08380	22
39	0.02879	0.99959	0.02881	34.71512	1.00041	34.72951	21
40	0.02908	0.99958	0.02910	34.36777	1.00042	34.38232	20
41	0.02938	0.99957	0.02939	34.02730	1.00043	34.04199	19
42	0.02967	0.99956	0.02968	33.69351	1.00044	33.70835	18
43	0.02996	0.99955	0.02997	33.36619	1.00045	33.38118	17
44	0.03025	0.99954	0.03026	33.04517	1.00046	33.06030	16
45	0.03054	0.99953	0.03055	32.73026	1.00047	32.74554	15
46	0.03083	0.99952	0.03084	32.42129	1.00048	32.43671	14
47	0.03112	0.99952	0.03114	32.11810	1.00048	32.13366	13
48	0.03141	0.99951	0.03143	31.82052	1.00049	31.83623	12
49	0.03170	0.99950	0.03172	31.52839	1.00050	31.54425	11
50	0.03199	0.99949	0.03201	31.24158	1.00051	31.25758	10
51	0.03228	0.99948	0.03230	30.95993	1.00052	30.97607	9
52	0.03257	0.99947	0.03259	30.68331	1.00053	30.69960	8
53	0.03286	0.99946	0.03288	30.41158	1.00054	30.42802	7
54	0.03316	0.99945	0.03317	30.14462	1.00055	30.16120	6
55	0.03345	0.99944	0.03346	29.88230	1.00056	29.89903	5
56	0.03374	0.99943	0.03376	29.62450	1.00057	29.64137	4
57	0.03403	0.99942	0.03405	29.37111	1.00058	29.38812	3
58	0.03432	0.99941	0.03434	29.12200	1.00059	29.13917	2
59	0.03461	0.99940	0.03463	28.87709	1.00060	28.89440	1
60	0.03490	0.99939	0.03492	28.63625	1.00061	28.65371	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

88 °

2°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.03490	0.99939	0.03492	28.63625	1.00061	28.65371	60
1	0.03519	0.99938	0.03521	28.39940	1.00062	28.41700	59
2	0.03548	0.99937	0.03550	28.16642	1.00063	28.18417	58
3	0.03577	0.99936	0.03579	27.93723	1.00064	27.95512	57
4	0.03606	0.99935	0.03609	27.71174	1.00065	27.72978	59
5	0.03635	0.99934	0.03638	27.48985	1.00066	27.30804	55
6	0.03664	0.99933	0.03667	27.27149	1.00067	27.28981	54
7	0.03693	0.99932	0.03696	27.05656	1.00068	27.07503	53
8	0.03723	0.99931	0.03725	26.84498	1.00069	26.86360	52
9	0.03752	0.99930	0.03754	26.63669	1.00070	26.65545	51
10	0.03781	0.99929	0.03783	26.43160	1.00072	26.45051	50
11	0.03810	0.99927	0.03812	26.22964	1.00073	26.24869	49
12	0.03839	0.99926	0.03842	26.03074	1.00074	26.04994	48
13	0.03868	0.99925	0.03871	25.83482	1.00075	25.85417	47
14	0.03897	0.99924	0.03900	25.64183	1.00076	25.66132	46
15	0.03926	0.99923	0.03929	25.45170	1.00077	25 47134	45
16	0.03955	0.99922	0.03958	25.26436	1.00078	25.28414	44
17	0.03984	0.99921	0.03987	25.07976	1.00079	25.09969	43
18	0.04013	0.99919	0.04016	24.89783	1.00081	24.81790	42
19	0.04042	0.99918	0 04046	24.71851	1.00082	24.73873	41
20	0.04071	0.99917	0.04075	24.54176	1.00083	24.56212	40
21	0.04100	0.99916	0.04104	24.36751	1.00084	24.38802	39
22	0.04129	0 99915	0.04133	24.19571	1.00085	24.21637	38
23	0.04159	0.99913	0.04162	24.02632	1.00087	24.04712	37
24	0.04188	0.99912	0.04191	23.85928	1.00088	23.88022	36
25	0.04217	0.99911	0.04220	23.69454	1.00089	23.71563	35
26	0.04246	0.99910	0.04250	23.53205	1.00090	23.55329	34
27	0.04275	0.99909	0.04279	23.37178	1.00091	23.39316	33
28	0.04304	0.99907	0.04308	23.21367	1.00093	23.23520	32
29	0.04333	0.99906	0.04337	23.05768	1.00094	23.07935	31
30	0.04362	0.99905	0.04366	22.90377	1.00095	22.92559	30
31	0 04391	0.99904	0.04395	22.75189	1.00097	22.77386	29
32	0.04420	0.99902	0.04424	22.60201	1.00098	22.62413	28
33	0.04449	0.99901	0.04454	22.45410	1.00099	22.47635	27
34	0.04478	0.99900	0.04483	22.30810	1.00100	22.33050	26
35	0.04507	0.99898	0.04512	22.16398	1.00102	22.18653	25
36	0.04536	0.99897	0.04541	22.02171	1.00103	22.04440	24
37	0.04565	0.99896	0.04570	21 88125	1.00104	21.90409	23
38	0.04594	0.99894	0.04599	21.74257	1.00106	21.76555	22
39	0.04623	0.99893	0.04628	21.60563	1.00107	21.62876	21
40	0.04653	0.99892	0.04658	21.47040	1.00108	21.49368	20
41	0.04682	0.99890	0.04687	21.33685	1.00110	21.36027	19
42	0.04711	0.99889	0.04716	21.20495	1.00111	21.22852	18
43	0.04740	0.99888	0.04745	21.07466	1.00113	21.09838	17
44	0.04769	0.99886	0.04774	20.94597	1.00114	20.96982	16
45	0.04798	0.99885	0.04803	20.81883	1.00115	20.84283	15
46	0.04827	0.99883	0.04831	20.69322	1.00117	20.71737	14
47	0.04856	0.99882	0.04862	20.56911	1.00118	20.59341	13
48	0.04885	0.99881	0.04891	20.44649	1.00120	20.57093	12
49	0.04914	0.99879	0.04920	20.32531	1.00121	20.34989	11
50	0.04943	0.99878	0.04949	20.20555	1.00122	20.23028	10
51	0.04972	0.99876	0.04978	20.08720	1.00124	20.11207	9
52	0.05001	0.99875	0.05007	19.97022	1.00125	19.99524	8
53	0.05030	0.99873	0.05037	19.85459	1.00127	19.87976	7
54	0.05059	0.99872	0.05066	19.74029	1.00128	19.76560	6
55	0.05088	0.99870	0.05095	19.62730	1.00130	19.65275	5
56	0.05117	0.99869	0.05124	19.51558	1.00131	19.54119	4
57	0.05146	0.99867	0.05153	19.40513	1.00133	19.43088	3
58	0.05175	0.99866	0.05182	19.29592	1.00134	19.32182	2
59	0.05205	0.99864	0.05212	19.18793	1.00136	19.21397	1
60	0.05234	0.69863	0.05241	19.08114	1.00137	19.10732	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

3°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.05234	0.99863	0.05241	19.08114	1.00137	19.10732	60
1	0.05263	0.99861	0.05270	18.97552	1.00139	19.00185	59
2	0.05292	0.99860	0.05299	18.87107	1.00140	18.89754	58
3	0.05321	0.99858	0.05328	18.76775	1.00142	18.79438	57
4	0.05350	0.99857	0.05357	18.66556	1.00143	18.69233	56
5	0.05379	0.99855	0.05387	18.56447	1.00145	18.59139	55
6	0.05408	0.90854	0.05416	18.46447	1.00147	18 49153	54
7	0.05437	0.99852	0.05445	18.36554	1.00148	18.39274	53
8	0.05466	0.99851	0.05474	18.26765	1.00150	18.29500	52
9	0.05495	0.99849	0.05503	18.17081	1.00151	18.19830	51
10	0.05524	0.99847	0.05533	18.07498	1.00153	18.10262	50
11	0.05553	0.99846	0.05562	17.98015	1.00155	18.00794	49
12	0.05582	0.99844	0 05591	17.88631	1.00156	17.91424	48
13	0.05611	0.99842	0.05620	17.79344	1.00158	17.82152	47
14	0.05640	0.99841	0.05649	17 70153	1.00159	17.72975	46
15	0.05669	0.99839	0.05678	17.61056	1.00161	17.63893	45
16	0.05698	0.99838	0.05708	17.52052	1.00163	17.54903	44
17	0.05727	0.99836	0.05737	17.43139	1.00164	17.46005	43
18	0 05756	0.99834	0.05766	17.34315	1.00166	17.37196	42
19	0.05785	0.99833	0.05795	17.25581	1.00168	17.28476	41
20	0.05814	0.99831	0.05824	17.16934	1.00169	17.19843	40
21	0.05844	0.99829	0.05854	17.08372	1.00171	17.11297	39
22	0.05873	0.99827	0.05883	16.99896	1.00173	17.02835	38
23	0.05902	0.99826	0.05912	16.91503	1.00175	16.94456	37
24	0.05931	0.99824	0.05941	16.83191	1.00176	16.86159	36
25	0.05960	0.99822	0.05970	16.74961	1.00178	16.77944	35
26	0.05989	0.99821	0.05999	16.66811	1.00180	16.69808	34
27	0.06018	0.99819	0.06029	16.58740	1.00182	16.61751	33
28	0.06047	0.99817	0.06058	16.50746	1.00183	16.53772	32
29	0.06076	0.99815	0.06087	16.42828	1 00185	16.45869	31
30	0.06105	0.99813	0.06116	16.34986	1.00187	16.38041	30
31	0.06134	0.99812	0.06145	16.27217	1.00189	16.30287	29
32	0.06163	0.99810	0.05175	16.19523	1.00190	16.22607	28
33	0.06192	0.99808	0.06204	16.11900	1.00192	16.14999	27
34	0.06221	0.99806	0.06233	16.04348	1.00194	16.07462	26
35	0.06250	0.99804	0.06262	15.96867	1 00196	15.99995	25
36	0.06279	0.99803	0.06291	15.89454	1.00198	15.92597	24
37	0.06308	0.99801	0.06321	15.82110	1.00200	15.85268	23
38	0.06337	0.99799	0.06350	15.74834	1.00201	15.78005	22
39	0 06366	0.99797	0.06379	15.67623	1.00203	15.70810	21
40	0.06395	0.99795	0.06408	15.60478	1.00205	15.63679	20
41	0.06424	0.99793	0.06438	15.53398	1.00207	15.56613	19
42	0.06453	0.99792	0.06467	15.46381	1.00209	15.49611	18
43	0.06482	0.99790	0.06496	15.39428	1.00211	15.42672	17
44	0.06511	0.99788	0.06525	15.32536	1.00213	15.35795	16
45	0.06540	0.99786	0.06554	15 25705	1.00215	15.28979	15
46	0.06569	0.99784	0.06584	15.18935	1.00216	15.22223	14
47	0.06598	0.99782	0.06613	15.12224	1.00218	15.15527	13
48	0.06627	0.99780	0 06642	15.05572	1.00220	15 08890	12
49	0.06656	0.99778	0.06671	14.98978	1.00222	15.02310	11
50	0.06685	0.99776	0.06700	14.92442	1.00224	14.95788	10
51	0.06714	0.99774	0.06730	14.85962	1.00226	14.89323	9
52	0.06743	0.99772	0.06759	14.79537	1.00228	14.82913	8
53	0.06773	0.99770	0.06788	14.73168	1.00230	14.76558	7
54	0.06802	0.99768	0.06817	14.66853	1.00232	14.70258	6
55	0.06831	0.99766	0.06847	14.60592	1.00234	14.64011	5
56	0 06860	0.99764	0.06876	14.54383	1.00236	14.57817	4
57	0.06889	0.99762	0.06905	14.48227	1.00238	14.51977	3
58	0 06918	0.99760	0.06934	14.42123	1.00240	14.45586	2
59	0.06947	0.99758	0.06963	14.36070	1.00242	14.39547	1
60	0.06976	0.99756	0.06993	14.30067	1.00244	14.33559	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

4 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.06976	0.99756	0.06993	14.30067	1.00244	14.33559	60
1	0.07005	0.99754	0.07022	14.24113	1.00246	14.27620	59
2	0.07034	0.99752	0.07051	14.18209	1.00248	14.21730	58
3	0.07063	0.99750	0.07080	14.12354	1.00250	14.15889	57
4	0.07092	0.99748	0.07110	14.06546	1.00252	14.10096	56
5	0.07121	0.99746	0.07139	14.00786	1.00254	14.04350	55
6	0.07150	0.99744	0.07168	13.95072	1.00257	13.98651	54
7	0.07179	0.99742	0.07197	13.89405	1.00259	13.92999	53
8	0.07208	0.99740	0.07227	13.83783	1.00261	13.87391	52
9	0.07237	0.99738	0.07256	13.78206	1.00263	13.81829	51
10	0.07266	0.99736	0.07285	13.72674	1.00265	13.76311	50
11	0.07295	0.99734	0 07314	13.67186	1.00267	13.70838	49
12	0.07324	0.99731	0.07344	13.61741	1.00269	13.65408	48
13	0.07353	0.99729	0.07373	13.56339	1.00271	13.60021	47
14	0.07382	0.99727	0.07402	13.50980	1.00274	13.54676	46
15	0.07411	0.99725	0.07431	13.45663	1.00276	13.49373	45
16	0.07440	0.99723	0.07461	13.40387	1.00278	13.44112	44
17	0.07469	0 99721	0.07490	13.35152	1.00280	13.38891	43
18	0 07498	0.99719	0.07519	13.29957	1.00282	13.33712	42
19	0.07527	0.99716	0.07548	13.24803	1.00284	13.28572	41
20	0.07556	0.99714	0.07578	13.19688	1.00287	13.23472	40
21	0.07585	0.99712	0.07607	13.14613	1.00289	13.18411	39
22	0.07614	0 99710	0.07636	13.09576	1.00291	13.13388	38
23	0.07643	0.99708	0.07665	13 04577	1.00293	13.08404	37
24	0.07672	0.99705	0.07695	12.99616	1.00296	13.03458	36
25	0.07701	0.99703	0.07724	12.94692	1.00298	12.98549	35
26	0.07730	0.99701	0.07753	12.89806	1.00300	12.93677	34
27	0.07759	0.99699	0.07782	12.84956	1.00302	12.88841	33
28	0.07788	0.99696	0.07812	12.80142	1.00305	12.84042	32
29	0.07817	0.99694	0.07841	12.75363	1.00307	12.79278	31
30	0.07846	0.99692	0.07870	12 70620	1.00309	12.74549	30
31	0.07875	0.99689	0.07899	12 65912	1.00312	12.69856	29
32	0.07904	0.99687	0.07929	12.61239	1.00314	12.65197	28
33	0.07933	0.99685	0.07958	12.56600	1.00316	12.60572	27
34	0.07962	0.99683	0.07987	12.51994	1.00318	12.55981	26
35	0.07991	0.99680	0.08017	12.47422	1.00321	12.51424	25
36	0 08020	0.99678	0.08046	12.42883	1.00323	12.46900	24
37	0.08049	0.99676	0.08075	12.38377	1.00326	12.42408	23
38	0.08078	0.99673	0.08104	12.33903	1.00328	12.37948	22
39	0.08107	0.99671	0.08134	12.29461	1.00330	12.33521	21
40	0.08136	0 99668	0.08163	12 25051	1.00333	12.29125	20
41	0.08165	0.99666	0.08192	12.20672	1.00335	12.24761	19
42	0.08194	0.99664	0.08221	12.16324	1.00337	12.20427	18
43	0.08223	0.99661	0.08251	12.12006	1.00340	12.16125	17
44	0.08252	0.99659	0.08280	12.07719	1.00342	12.11852	16
45	0.08281	0.99657	0.08309	12.03462	1.00345	12.07610	15
46	0.08310	0.99654	0.08339	11.99235	1.00347	12.03397	14
47	0.08339	0.99652	0.08368	11.95037	1.00349	11.99214	13
48	0.08368	0.99649	0.08397	11.90868	1.00352	11.95059	12
49	0.08397	0.99647	0.08426	11.86728	1.00354	11.90934	11
50	0.08426	0.99644	0.08456	11.82617	1.00357	11.86837	10
51	0.08455	0.99642	0.08485	11.78533	1.00359	11.82768	9
52	0.08484	0.99639	0.08514	11.74478	1 00362	11.78727	8
53	0.08513	0.99637	0.08544	11.70450	1.00364	11.74714	7
54	0.08542	0.99635	0.08573	11.66450	1.00367	11.70728	6
55	0.08571	0.99632	0.08602	11.62476	1.00369	11.66769	5
56	0.08600	0.99630	0.08632	11.58529	1.00372	11.62837	4
57	0.08629	0.99627	0.08661	11.54609	1.00374	11.58932	3
58	0.08658	0.99625	0.08690	11.50715	1.00377	11.55052	2
56	0.08687	0.99622	0.08720	11.46847	1.00379	11.51199	1
60	0.08716	0.99619	0.08749	11 43005	1.00382	11.47371	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

5 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.08716	0.99619	0.08749	11.43005	1.00382	11.47371	60
1	0.08745	0.99617	0.08778	11.39188	1.00385	11.43569	59
2	0.08774	0.99614	0.08807	11.35397	1.00387	11.39792	58
3	0.08803	0.99612	0.08837	11.31630	1.00390	11.36040	57
4	0.08831	0.99609	0.08866	11.27889	1.00392	11.32313	56
5	0.08860	0.99607	0.08895	11.24171	1.00395	11.28610	55
6	0.08889	0.99604	0.08925	11.20478	1.00397	11.24932	54
7	0.08918	0.99602	0.08954	11.16809	1.00400	11.21277	53
8	0.08947	0.99599	0.08983	11.13164	1.00403	11.17646	52
9	0.08976	0.99596	0.09013	11.09542	1.00405	11.14039	51
10	0.09005	0.99594	0.09042	11.05943	1.00408	11.10455	50
11	0.09034	0.99591	0.09071	11.02368	1.00411	11.06894	49
12	0.09063	0.99588	0.09101	10.98815	1.00413	11.03356	48
13	0.09092	0.99586	0.09130	10.95285	1.00416	10.99841	47
14	0.09121	0.99583	0.09159	10.91777	1.00419	10.96348	46
15	0.09150	0.99580	0.09189	10.88292	1.00421	10.92877	45
16	0.09179	0.99578	0.09218	10.84829	1.00424	10.89428	44
17	0.09208	0.99575	0.09247	10.81387	1.00427	10.86001	43
18	0.09237	0.99572	0.09277	10.77967	1.00429	10.82596	42
19	0.09266	0.99570	0.09306	10.74569	1.00432	10.79212	41
20	0.09295	0.99567	0.09335	10.71191	1.00435	10.75849	40
21	0.09324	0.99564	0.09365	10.67835	1.00438	10.72507	39
22	0.09353	0.99562	0.09394	10.64499	1.00440	10.69186	38
23	0.09382	0.99559	0.09423	10.61184	1.00443	10.65885	37
24	0.09411	0.99556	0.09453	10.57889	1.00446	10.62605	36
25	0.09440	0.99553	0.09482	10.54615	1.00449	10.59346	35
26	0.09469	0.99551	0.09511	10.51361	1.00451	10.56106	34
27	0.09498	0.99548	0.09541	10.48126	1.00454	10 52886	33
28	0.09527	0.99545	0.09570	10.44911	1.00457	10.49685	32
29	0.09556	0.99542	0.09600	10.41716	1.00460	10.46505	31
30	0.09585	0.99540	0.09629	10.38540	1 00463	10.43343	30
31	0.09614	0.99537	0.09658	10.35383	1.00465	10.40201	29
32	0.09642	0.99534	0.09688	10.32245	1.00468	10 37077	28
33	0.09671	0.99531	0 09717	10.29126	1.00471	10.33973	27
34	0.09700	0.99528	0.09746	10.26025	1.00474	10.30887	26
35	0.09729	0.99526	0.09776	10.22943	1.00477	10 27819	25
36	0.09758	0.99523	0.09805	10.19879	1.00480	10.24770	24
37	0.09787	0.99520	0.09834	10.16833	1.00482	10.21739	23
38	0.09816	0.99517	0.09864	10.13805	1.00485	10.18725	22
39	0 09845	0.99514	0.09893	10.10795	1.00488	10.15730	21
40	0.09874	0.99511	0.09923	10.07803	1.00491	10.12752	20
41	0.09903	0.99508	0.09952	10.04828	1.00494	10.09792	19
42	0.09932	0.99506	0.09981	10 01871	1.00497	10.06849	18
43	0.09961	0.99503	0.10011	9.98930	1.00500	10.03923	17
44	0.09990	0.99500	0.10040	9.96007	1.00503	10.01015	16
45	0.10019	0.99497	0.10069	9.93101	1.00506	9.98123	15
46	0.10048	0.99494	0.10099	9.90211	1.00509	9.95248	14
47	0.10077	0.99491	0.10128	9.87338	1.00512	9.92389	13
48	0.10106	0.99488	0.10158	9.84482	1.00515	9.89547	12
49	0.10135	0.99485	0.10187	9.81641	1 00518	9.86722	11
50	0.10164	0.99482	0.10216	9.78817	1.00521	9.83912	10
51	0.10192	0.99479	0.10246	9.76009	1.00524	9.81119	9
52	0.10221	0.99476	0.10275	9.73217	1.00527	9.78341	8
53	0.10250	0.99473	0.10305	9.70441	1.00530	9.75579	7
54	0.10279	0.99470	0.10334	9 67680	1.00533	9 72833	6
55	0 10308	0.99467	0.10363	9.64935	1.00536	9.70103	5
56	0.10337	0.99464	0.10393	9.62205	1.00539	9.67387	4
57	0.10366	0.99461	0.10422	9.59490	1.00542	9.64687	3
58	0.10395	0.99458	0.10452	9.56791	1.00545	9.62002	2
59	0.10424	0.99455	0.10481	9.54106	1.00548	9.59332	1
60	0.10453	0.99452	0.10510	9.51436	1.00551	9.56677	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

84 °

6°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.10453	0.99452	0.10510	9.51436	1.00551	9.56677	60
1	0.10482	0.99449	0.10540	9.48781	1.00554	9.54037	59
2	0.10511	0.99446	0.10569	9.46141	1.00557	9.51411	58
3	0.10540	0.99443	0.10599	9.43515	1.00560	9.48800	57
4	0.10569	0.99440	0.10628	9.40904	1.00563	9.46203	56
5	0.10597	0.99437	0.10657	9.38307	1.00566	9.43620	55
6	0.10626	0.99434	0.10687	9.35724	1.00569	9.41052	54
7	0.10655	0.99431	0.10716	9.33155	1.00573	9.38497	53
8	0.10684	0.99428	0.10746	9.30599	1.00576	9.35957	52
9	0.10713	0.99424	0.10775	9.28058	1.00579	9.33430	51
10	0.10742	0.99421	0.10805	9.25530	1.00582	9.30917	50
11	0.10771	0.99418	0.10834	9.23016	1.00585	9.28417	49
12	0.10800	0.99415	0.10863	9.20516	1.00588	9.25931	48
13	0.10829	0.99412	0.10893	9.18028	1.00592	9.23459	47
14	0.10858	0.99409	0.10922	9.15554	1.00595	9.20999	46
15	0.10887	0.99406	0.10952	9.13093	1.00598	9.18553	45
16	0.10916	0.99402	0.10981	9.10646	1.00601	9.16120	44
17	0.10945	0.99399	0.11011	9.08211	1.00604	9.13699	43
18	0.10973	0.99396	0.11040	9.05789	1.00608	9.11292	42
19	0.11002	0.99393	0.11070	9.03379	1.00611	9.08897	41
20	0.11031	0.99390	0.11099	9.00983	1.00614	9.06515	40
21	0.11060	0.99386	0.11128	8.98598	1.00617	9.04146	39
22	0.11089	0.99383	0.11158	8.96227	1.00621	9.01788	38
23	0.11118	0.99380	0.11187	8.93867	1.00624	8.99444	37
24	0.11147	0.99377	0.11217	8.91520	1.00627	8.97111	36
25	0.11176	0.99374	0.11246	8.89185	1.00630	8.94791	35
26	0.11205	0.99370	0.11276	8.86862	1.00634	8.92482	34
27	0.11234	0.99367	0.11305	8.84551	1.00637	8.90186	33
28	0.11263	0.99364	0.11335	8.82252	1.00640	8.87901	32
29	0.11291	0.99360	0.11364	8.79964	1.00644	8.85628	31
30	0.11320	0.99357	0.11394	8.77689	1.00647	8.83367	30
31	0.11349	0.99354	0.11423	8 75425	1.00650	8.81118	29
32	0.11378	0.99351	0.11452	8.73172	1.00654	8.78880	28
33	0.11407	0 99347	0.11482	8.70931	1.00657	8.76653	27
34	0.11436	0.99344	0.11511	8.68701	1.00660	8.74438	26
35	0.11465	0.99341	0.11541	8.66482	1.00664	8.72234	25
36	0.11494	0.99337	0.11570	8.64275	1.00667	8.70041	24
37	0.11523	0.99334	0.11600	8.62078	1.00671	8.67859	23
38	0.11552	0.99331	0.11629	8.59893	1.00674	8.65688	22
39	0.11580	0.99327	0.11659	8.57718	1.00677	8.63528	21
40	0.11609	0.99324	0.11688	8.55555	1.00681	8.61379	20
41	0.11638	0.99320	0.11718	8.53402	1.00684	8.59241	19
42	0.11667	0.99317	0.11747	8.51259	1.00688	8.57113	18
43	0.11696	0.99314	0.11777	8.49128	1.00691	8.54996	17
44	0.11725	0.99310	0.11806	8.47007	1.00695	8.52889	16
45	0.11754	0.99307	0.11836	8.44896	1.00698	8.50793	15
46	0.11783	0.99303	0.11865	8 42795	1.00701	8.48707	14
47	0.11812	0.99300	0.11895	8.40705	1.00705	8.46632	13
48	0.11840	0.99297	0.11924	8.38625	1.00708	8.44566	12
49	0.11869	0.99293	0.11954	8.36555	1.00712	8.42511	11
50	0.11898	0.99290	0.11983	8.34496	1.00715	8.40466	10
51	0.11927	0.99286	0.12013	8.32446	1.00719	8.38431	9
52	0.11956	0.99283	0.12042	8.30406	1.00722	8.36405	8
53	0.11985	0.992 7	0.12072	8.28376	1.00726	8.34390	7
54	0.12014	0.99276	0 12101	8.26355	1.00730	8.32384	6
55	0.12043	0.99272	0.12131	8.24345	1.00733	8.30388	5
56	0.12071	0.99269	0.12160	8.22344	1.00737	8.28402	4
57	0.12100	0.99265	0.12190	8.20352	1.00740	8.26425	3
58	0.12129	0.99262	0.12219	8.18370	1.00744	8.24457	2
59	0.12158	0.99258	0.12249	8.16398	1.00747	8.22500	1
60	0.12187	0.99255	0.12278	8.14435	1.00751	8.20551	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

7 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.12187	0.99255	0.12278	8.14435	1.00751	8.20551	60
1	0.12216	0.99251	0.12308	8.12481	1.00755	8.18612	59
2	0.12245	0.99248	0.12338	8.10536	1.00758	8.16681	58
3	0.12274	0.99244	0.12367	8.08600	1.00762	8 14760	57
4	0.12302	0.99240	0.12397	8.06674	1.00765	8.12849	56
5	0.12331	0.99237	0.12426	8.04756	1.00769	8.10946	55
6	0.12360	0.99233	0.12456	8.02848	1.00773	8.09052	54
7	0.12389	0.99230	0.12485	8.00948	1.00776	8.07167	53
8	0.12418	0.99226	0.12515	7.99058	1.00780	8.05291	52
9	0.12447	0.99222	0.12544	7.97176	1.00784	8.03423	51
10	0.12476	0.99219	0.12574	7.95302	1.00787	8.01565	50
11	0.12504	0.99215	0.12603	7.93438	1.00791	7.99714	49
12	0.12533	0.99211	0.12633	7.91582	1.00795	7.97873	48
13	0.12562	0.99208	0.12662	7.89734	1.00798	7.96040	47
14	0.12591	0.99204	0.12692	7.87895	1.00802	7.94216	46
15	0.12620	0.99200	0.12722	7.86064	1.00806	7.92399	45
16	0.12649	0.99197	0.12751	7.84242	1.00810	7.90592	44
17	0.12678	0.99193	0.12781	7.82428	1.00813	7.88792	43
18	0.12706	0.99189	0.12810	7.80622	1.00817	7.87001	42
19	0.12735	0.99186	0.12840	7.78825	1.00821	7.85218	41
20	0.12764	0.99182	0.12869	7.77035	1.00825	7.83443	40
21	0.12793	0.99178	0.12899	7.75254	1.00828	7.81677	39
22	0.12822	0.99175	0.12929	7.73480	1.00832	7.79918	38
23	0.12851	0.99171	0.12958	7.71715	1.00836	7.78167	37
24	0.12880	0.99167	0.12988	7 69957	1.00840	7.76424	36
25	0.12908	0.99163	0.13017	7.68208	1.00844	7.74689	35
26	0.12937	0.99160	0.13047	7.66466	1.00848	7.72962	34
27	0.12966	0.99156	0.13076	7.64732	1.00851	7.71242	33
28	0.12995	0 99152	0.13106	7.63005	1.00855	7.69530	32
29	0.13024	0.99148	0.13136	7.61287	1.00859	7.67826	31
30	0.13053	0 99144	0.13165	7.59575	1.00863	7.66130	30
31	0.13081	0.99141	0.13195	7.57872	1.00867	7.64441	29
32	0.13110	0.99137	0.13224	7.56176	1.00871	7.62759	28
33	0.13139	0.99133	0.13254	7.54487	1.00875	7.61085	27
34	0.13168	0.99129	0.13284	7.52806	1.00878	7.59418	26
35	0.13197	0.99125	0.13313	7.51132	1.00882	7.57759	25
36	0.13226	0.99122	0.13343	7.49465	1.00886	7.56107	24
37	0.13254	0.99118	0.13372	7.47806	1.00890	7.54462	23
38	0.13283	0.99114	0.13402	7.46154	1.00894	7.52825	22
39	0.13312	0.99110	0.13432	7.44509	1.00898	7.51194	21
40	0.13341	0.99106	0.13461	7.42871	1.00902	7.49571	20
41	0.13370	0 99102	0.13491	7.41240	1.00906	7.47955	19
42	0.13399	0.99098	0.13521	7.39616	1.00910	7.46346	18
43	0.13427	0.99094	0.13550	7.37999	1.00914	7.44743	17
44	0.13456	0.99091	0.13580	7.36389	1.00918	7.43148	16
45	0.13485	0.99087	0.13609	7.34786	1.00922	7.41560	15
46	0.13514	0.99083	0.13639	7.33190	1.00926	7.39978	14
47	0.13543	0.99079	0.13669	7.31600	1.00930	7.38403	13
48	0.13572	0.99075	0.13698	7.30018	1 00934	7.36835	12
49	0.13600	0.99071	0.13728	7.28442	1.00938	7.35274	11
50	0.13629	0.99067	0.13758	7.26873	1.00942	7.33719	10
51	0.13658	0.99063	0.13787	7.25310	1.00946	7.32171	9
52	0.13687	0.99059	0.13817	7.23754	1.00950	7.30630	8
53	0.13716	0.99055	0.13846	7.22204	1.00954	7.29095	7
54	0.13744	0.99051	0.13876	7.20661	1 00958	7.27566	6
55	0.13773	0.99047	0.13906	7.19125	1.00962	7.26044	5
56	0.13802	0.99043	0.13935	7.17594	1.00966	7.24529	4
57	0.13831	0.99039	0.13965	7.16071	1.00970	7.23019	3
58	0.13860	0 99035	0.13995	7.14553	1.00975	7.21517	2
59	0.13889	0.99031	0.14024	7.13042	1.00979	7.20020	1
60	0.13917	0.99027	0.14054	7.11537	1.00983	7.18530	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

82 °

8°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.13917	0.99027	0.14054	7.11537	1.00983	7.18530	60
1	0.13946	0.99023	0.14084	7.10038	1.00987	7.17046	59
2	0.13975	0.99019	0.14113	7.08546	1.00991	7.15568	58
3	0.14004	0.99015	0.14143	7.07059	1.00995	7.14096	57
4	0.14033	0.99011	0.14173	7.05579	1.00999	7.12630	56
5	0.14061	0.99006	0.14202	7.04105	1.01004	7.11171	55
6	0.14090	0.99002	0.14232	7.02637	1.01008	7.09717	54
7	0.14119	0.98998	0.14262	7.01174	1.01012	7.08269	53
8	0.14148	0.98994	0.14291	6.99718	1.01016	7.06828	52
9	0.14177	0.98990	0.14321	6.98268	1.01020	7.05392	51
10	0.14205	0.98986	0.14351	6.96823	1.01024	7.03962	50
11	0.14234	0.98982	0.14381	6.95385	1.01029	7.02538	49
12	0.14263	0.98978	0.14410	6.93952	1.01033	7.01120	48
13	0.14292	0.98973	0.14440	6.92525	1.01037	6.99708	47
14	0.14320	0.98969	0.14470	6.91104	1.01041	6.98301	46
15	0.14349	0.98965	0.14499	6.89688	1.01046	6.96900	45
16	0.14378	0.98961	0.14529	6.88278	1.01050	6.95505	44
17	0.14407	0.98957	0.14559	6.86874	1.01054	6 94115	43
18	0.14436	0.98953	0.14588	6.85475	1.01059	6.92731	42
19	0.14464	0.98948	0.14618	6.84082	1.01063	6.91352	41
20	0.14493	0.98944	0.14648	6.82694	1.01067	6.89979	40
21	0.14522	0.98940	0.14678	6.81312	1.01071	6.88612	39
22	0.14551	0.98936	0.14707	6.79936	1.01076	6.87250	38
23	0.14580	0.98931	0.14737	6.78564	1.01080	6.85893	37
24	0.14608	0.98927	0.14767	6.77199	1.01084	6.84542	36
25	0.14637	0.98923	0.14796	6.75838	1.01089	6.83196	35
26	0.14666	0.98919	0.14826	6.74483	1.01093	6.81856	34
27	0.14695	0.98914	0.14856	6.73133	1.01097	6.80521	33
28	0.14723	0.98910	0.14886	6.71789	1.01102	6.79191	32
29	0.14752	0.98906	0.14915	6.70450	1.01106	6.77866	31
30	0.14781	0.98902	0.14945	6.69116	1.01111	6.76547	30
31	0.14810	0.98897	0.14975	6 67787	1.01115	6.75233	29
32	0.14838	0.98893	0.15005	6.66463	1.01119	6.73924	28
33	0.14867	0.98889	0.15034	6.65144	1.01124	6.72620	27
34	0.14896	0.98884	0.15064	6.63831	1.01128	6.71321	26
35	0.14925	0.98880	0.15094	6.62523	1.01133	6.70027	25
36	0.14954	0.98876	0.15124	6.61219	1.01137	6.68738	24
37	0.14982	0.98871	0.15153	6.59921	1 01142	6.67454	23
38	0.15011	0.98867	0.15183	6.58627	1.01146	6.66176	22
39	0.15040	0.98863	0.15213	6.57339	1.01151	6.64902	21
40	0.15069	0.98858	0.15243	6.56055	1.01155	6.63633	20
41	0.15097	0.98854	0.15272	6.54777	1.01159	6.62369	19
42	0.15126	0.98849	0.15302	6.53503	1.01164	6 61110	18
43	0.15155	0.98845	0.15332	6.52234	1.01169	6.59855	17
44	0.15184	0.98841	0.15362	6.50970	1 01173	6.58606	16
45	0.15212	0.98836	0.15391	6.49710	1.01178	6 57361	15
46	0.15241	0.98832	0.15421	6.48456	1.01182	6.56121	14
47	0.15270	0.98827	0.15451	6.47206	1.01187	6.54886	13
48	0.15299	0.98823	0.15481	6.45961	1.01191	6.53655	12
49	0.15327	0.98818	0.15511	6.44720	1.01196	6.52429	11
50	0.15356	0.98814	0.15540	6.43484	1.01200	6.51208	10
51	0.15385	0.98809	0.15570	6.42253	1.01205	6.49991	9
52	0.15414	0.98805	0.15600	6.41026	1.01209	6.48779	8
53	0.15442	0.98800	0.15630	6.39804	1.01214	6.47572	7
54	0.15471	0.98796	0.15660	6.38587	1.01219	6.46369	6
55	0.15500	0.98791	0.15689	6.37374	1.01223	6.45171	5
56	0.15529	0.98787	0.15719	6.36165	1.01228	6.43977	4
57	0.15557	0.98782	0.15749	6 34961	1.01233	6.42787	3
58	0.15586	0.98778	0.15779	6.33761	1.01237	6.41602	2
59	0.15615	0.98773	0.15809	6.32566	1.01242	6.40422	1
60	0.15643	0.98769	0.15838	6.31375	1.01247	6.39245	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

9°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.15643	0.98769	0.15838	6.31375	1.01247	6.39245	60
1	0.15672	0.98764	0.15868	6.30189	1.01251	6.38073	59
2	0.15701	0.98760	0.15898	6.29007	1.01256	6.36906	58
3	0.15730	0.98755	0.15928	6.27829	1.01261	6.35743	57
4	0.15758	0.98751	0.15958	6.26655	1.01265	6.34584	56
5	0.15787	0.98746	0.15988	6.25486	1.01270	6.33429	55
6	0.15816	0.98741	0.16017	6.24321	1.01275	6.32279	54
7	0.15845	0.98737	0.16047	6.23160	1.01279	6.31133	53
8	0.15873	0.98732	0.16077	6.22003	1.01284	6.29991	52
9	0.15902	0.98728	0.16107	6.20851	1.01289	6.28853	51
10	0.15931	0.98723	0.16137	6.19703	1.01294	6.27719	50
11	0.15959	0.98718	0.16167	6.17559	1.01298	6.26590	49
12	0.15988	0.98714	0.16196	6.17419	1.01303	6.25464	48
13	0.16017	0.98709	0.16226	6.16283	1.01308	6.24343	47
14	0.16046	0.98704	0.16256	6.15151	1.01313	6.23226	46
15	0.16074	0.98700	0.16286	6.14023	1.01318	6.22113	45
16	0.16103	0.98695	0.16316	6.12899	1.01322	6.21004	44
17	0.16132	0.98690	0.16346	6.11779	1.01327	6.19898	43
18	0.16160	0.98686	0.16376	6.10664	1.01332	6.18797	42
19	0.16189	0.98681	0.16405	6.09552	1.01337	6.17700	41
20	0.16218	0.98676	0.16435	6.08444	1.01342	6.16607	40
21	0.16246	0.98671	0.16465	6.07340	1.01346	6.15517	39
22	0.16275	0.98667	0.16495	6.06240	1.01357	6.14432	38
23	0.16304	0.98662	0.16525	6.05143	1.01356	6.13350	37
24	0.16333	0.98657	0.16555	6.04051	1.01361	6.12273	36
25	0.16361	0.98652	0.16585	6.02962	1.01366	6.11199	35
26	0.16390	0.98648	0.16615	6 01878	1.01371	6.10129	34
27	0.16419	0.98643	0.16645	6.00797	1.01376	6.09062	33
28	0.16447	0.98638	0.16674	5.99720	1.01381	6.08000	32
29	0.16476	0.98633	0.16704	5.98646	1.01386	6.06941	31
30	0.16505	0.98629	0.16734	5.97576	1.01391	6.05886	30
31	0.16533	0.98624	0.16764	5.96510	1.01395	6.04834	29
32	0.16562	0.98619	0.16794	5.95448	1.01400	6.03787	28
33	0.16591	0.98614	0.16824	5.94390	1.01405	6.02743	27
34	0.16620	0.98609	0.16854	5.93335	1.01410	6.01702	26
35	0.16648	0.98604	0.16884	5.92283	1.01415	6.00666	25
36	0.16677	0.98600	0.16914	5.91236	1.01420	5.99633	24
37	0.16706	0.98595	0.16944	5.90191	1.01425	5.98603	23
38	0.16734	0.98590	0.16974	5.89151	1.01430	5.97577	22
39	0.16763	0.98585	0.17004	5.88114	1.01435	5.96555	21
40	0.16792	0.98580	0.17033	5.87080	1.01440	5.95536	20
41	0.16820	0.98575	0.17063	5.86051	1.01445	5.94521	19
42	0.16849	0.98570	0.17093	5.85024	1.01450	5.93506	18
43	0.16878	0.98565	0.17123	5.84001	1.01455	5.92501	17
44	0.16906	0.98561	0.17153	5.82982	1.01460	5.91496	16
45	0.16935	0.98556	0.17183	5.81966	1.01466	5.90495	15
46	0.16964	0.98551	0.17213	5.80953	1.01471	5.89497	14
47	0.16992	0.98546	0.17243	5.79944	1.01476	5.88502	13
48	0.17021	0.98541	0.17273	5.78938	1.01481	5.87511	12
49	0.17050	0.98536	0.17303	5.77936	1.01486	5.86524	11
50	0.17078	0.98531	0.17333	5.76937	1.01491	5.85539	10
51	0.17107	0.98526	0.17363	5.75941	1.01496	5.84558	9
52	0.17136	0.98521	0.17393	5.74949	1.01501	5.83581	8
53	0.17164	0.98516	0.17423	5.73960	1.01506	5.82608	7
54	0.17193	0.98511	0.17453	5.72974	1.01512	5.81638	6
55	0.17222	0.98506	0.17483	5.71992	1.01517	5.80672	5
56	0.17250	0.98501	0.17513	5.71013	1.01522	5.79709	4
57	0.17279	0.98496	0.17543	5.70037	1.01527	5.78749	3
58	0.17308	0.98491	0.17573	5.69064	1.01532	5.77793	2
59	0.17336	0.98486	0.17603	5.68094	1.01537	5.76840	1
60	0.17365	0.98481	0.17633	5.67128	1.01543	5.75891	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

80°

10°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.17365	0.98481	0.17633	5.67128	1.01543	5.75877	60
1	0.17393	0.98476	0.17663	5.66165	1.01548	5.74929	59
2	0.17422	0.98471	0.17693	5.65205	1.01553	5.73983	58
3	0.17451	0.98466	0.17723	5.64248	1.01558	5.73041	57
4	0.17479	0.98461	0.17753	5.63295	1.01564	5.72102	56
5	0.17508	0.98455	0.17783	5.62344	1.01569	5.71166	55
6	0.17537	0.98450	0.17813	5.61397	1.01574	5.70234	54
7	0.17565	0.98445	0.17843	5.60452	1.01579	5.69304	53
8	0.17594	0.98440	0.17873	5.59511	1.01585	5.68377	52
9	0.17623	0.98435	0.17903	5.58573	1.01590	5.67454	51
10	0.17651	0.98430	0.17933	5.57638	1.01595	5.66533	50
11	0.17680	0.98425	0.17963	5.56706	1.01601	5.65616	49
12	0.17708	0.98420	0.17993	5.55777	1.01606	5.64701	48
13	0.17737	0.98414	0.18023	5.54851	1.01611	5.63790	47
14	0.17766	0.98409	0.18053	5.53927	1.01616	5.62881	46
15	0.17794	0.98404	0.18083	5.53007	1.01622	5.61976	45
16	0.17823	0.98399	0.18113	5.52090	1.01627	5.61073	44
17	0.17852	0.98394	0.18143	5.51176	1.01633	5.60174	43
18	0.17880	0.98389	0.18173	5.50264	1.01638	5.59277	42
19	0.17909	0.98383	0.18203	5.49356	1.01643	5.58383	41
20	0.17937	0.98378	0.18233	5.48451	1.01649	5.57493	40
21	0.17966	0.98373	0.18263	5.47548	1.01654	5.56605	39
22	0.17995	0.98368	0.18293	5.46648	1.01659	5.55720	38
23	0.18023	0.98362	0.18323	5.45751	1.01665	5.54837	37
24	0.18052	0.98357	0.18353	5.44857	1.01670	5.53958	36
25	0.18081	0.98352	0.18384	5.43966	1.01676	5.53081	35
26	0.18109	0.98347	0.18414	5.43078	1.01681	5.52208	34
27	0.18138	0.98341	0.18444	5.42192	1.01687	5.51337	33
28	0.18166	0.98336	0.18474	5.41309	1.01692	5.50468	32
29	0.18195	0.98331	0.18504	5.40429	1.01698	5.49603	31
30	0.18224	0.98325	0.18534	5.39552	1.01703	5.48740	30
31	0.18252	0.98320	0.18564	5.38677	1.01709	5.47881	29
32	0.18281	0.98315	0.18594	5.37805	1.01714	5.47023	28
33	0.18309	0.98310	0.18624	5.36936	1.01720	5.46169	27
34	0.18338	0.98304	0.18654	5.36070	1.01725	5.45317	26
35	0.18367	0.98299	0.18684	5.35206	1.01731	5.44468	25
36	0.18395	0.98294	0.18714	5.34345	1.01736	5.43622	24
37	0.18424	0.98288	0.18745	5.33487	1.01742	5.42778	23
38	0.18452	0.98283	0.18775	5.32631	1.01747	5.41937	22
39	0.18481	0.98277	0.18805	5.31778	1.01753	5.41099	21
40	0.18509	0.98272	0.18835	5.30928	1.01758	5.40263	20
41	0.18538	0.98267	0.18865	5.30080	1.01764	5.39430	19
42	0.18567	0.98261	0.18895	5.29235	1.01769	5.38600	18
43	0.18595	0.98256	0.18925	5.28393	1.01775	5.37772	17
44	0.18624	0.98250	0.18955	5.27553	1.01781	5.36947	16
45	0.18652	0.98245	0.18986	5.26715	1.01786	5.36124	15
46	0.18681	0.98240	0.19016	5.25880	1.01792	5.35304	14
47	0.18710	0.98234	0.19046	5.25048	1.01798	5.34486	13
48	0.18738	0.98229	0.19076	5.24218	1.01803	5.33671	12
49	0.18767	0.98223	0.19106	5.23391	1.01809	5.32859	11
50	0.18795	0.98218	0.19136	5.22566	1.01815	5.32049	10
51	0.18824	0.98212	0.19166	5.21744	1.01820	5.31241	9
52	0.18852	0.98207	0.19197	5.20925	1.01826	5.30436	8
53	0.18881	0.98201	0.19227	5.20107	1.01832	5.29634	7
54	0.18910	0.98196	0.19257	5.19293	1.01837	5.28833	6
55	0.18938	0.98190	0.19287	5.18480	1.01843	5.28036	5
56	0.18967	0.98185	0.19317	5.17671	1.01849	5.27241	4
57	0.18995	0.98179	0.19347	5.16863	1.01854	5.26448	3
58	0.19024	0.98174	0.19378	5.16058	1.01860	5.25658	2
59	0.19052	0.98168	0.19408	5.15256	1.01866	5.24870	1
60	0.19081	0.98163	0.19438	5.14455	1.01872	5.24084	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

11°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.19081	0.98163	0.19438	5.14455	1.01872	5.24084	60
1	0.19109	0.98157	0.19468	5.13658	1.01877	5.23301	59
2	0.19138	0.98152	0.19498	5.12862	1.01883	5.22520	58
3	0.19167	0.98146	0.19529	5.12069	1.01889	5.21742	57
4	0.19195	0.98140	0.19559	5.11279	1.01895	5.20966	56
5	0.19224	0.98135	0.19589	5.10490	1.01901	5.20193	55
6	0.19252	0.98129	0.19619	5.09704	1.01906	5.19421	54
7	0.19281	0.98124	0.19649	5.08921	1.01912	5.18652	53
8	0.19309	0.98118	0.19680	5.08139	1.01918	5.17886	52
9	0.19338	0.98112	0.19710	5.07360	1.01924	5.17121	51
10	0.19366	0.98107	0.19740	5.06584	1.01930	5.16359	50
11	0.19395	0.98101	0.19770	5.05809	1.01936	5.15599	49
12	0.19424	0.98096	0.19801	5.05037	1.01941	5.14842	48
13	0.19452	0.98090	0.19831	5.04267	1.01947	5.14087	47
14	0.19481	0.98084	0.19861	5.03499	1.01953	5.13334	46
15	0.19509	0.98079	0.19891	5.02734	1.01959	5.12583	45
16	0.19538	0.98073	0.19921	5.01971	1.01965	5.11835	44
17	0.19566	0.98067	0.19952	5.01210	1.01971	5.11088	43
18	0.19595	0.98061	0.19982	5.00451	1.01977	5.10344	42
19	0.19623	0.98056	0.20012	4.99695	1.01983	5.09602	41
20	0.19652	0.98050	0.20042	4.98940	1.01989	5.08863	40
21	0.19680	0.98044	0.20073	4.98188	1.01995	5.08125	39
22	0.19709	0.98039	0.20103	4.97438	1.02001	5.07390	38
23	0.19737	0.98033	0.20133	4.96690	1.02007	5.06657	37
24	0.19766	0.98027	0.20164	4.95945	1.02013	5.05926	36
25	0.19794	0.98021	0.20194	4.95201	1.02019	5.05197	35
26	0.19823	0.98016	0.20224	4.94460	1.02025	5.04471	34
27	0.19851	0.98010	0.20254	4.93721	1.02031	5.03746	33
28	0.19880	0.98004	0.20285	4.92984	1.02037	5.03024	32
29	0.19908	0.97998	0.20315	4.92249	1.02043	5.02303	31
30	0.19937	0.97992	0.20345	4.91516	1.02048	5.01575	30
31	0.19965	0.97987	0.20376	4.90785	1.02055	5.00869	29
32	0.19994	0.97981	0.20406	4.90056	1.02061	5.00155	28
33	0.20022	0.97975	0.20436	4.86330	1.02067	4.99443	27
34	0.20051	0.97969	0.20466	4.88605	1.02073	4.98733	26
35	0.20079	0.97963	0.20497	4.87882	1.02079	4.98025	25
36	0.20108	0.97958	0.20527	4.87162	1.02085	4.97320	24
37	0.20136	0.97952	0.20557	4.86444	1.02081	4.96616	23
38	0.20165	0.97946	0.20588	4.85727	1.02097	4.95914	22
39	0.20193	0.97940	0.20618	4.85013	1.02103	4.95215	21
40	0.20222	0.97934	0.20648	4.84300	1.02110	4.94517	20
41	0.20250	0.97928	0.20679	4.83590	1.02116	4.93821	19
42	0.20279	0.97922	0.20709	4.82882	1.02122	4.93128	18
43	0.20307	0.97916	0.20739	4.82175	1.02128	4.92436	17
44	0.20336	0.97910	0.20770	4.81471	1.02134	4.91746	16
45	0.20364	0.97905	0.20800	4.80769	1.02140	4.91058	15
46	0.20393	0.97899	0.20830	4.80068	1.02146	4.90373	14
47	0.20421	0.97893	0.20861	4.79370	1.02153	4.89689	13
48	0.20450	0.97887	0.20891	4.78673	1.02159	4.89007	12
49	0.20478	0.97881	0.20921	4.77978	1.02165	4.88327	11
50	0.20507	0.97875	0.20952	4.77286	1.02171	4.87649	10
51	0.20535	0.97869	0.20982	4.76595	1.02178	4.86973	9
52	0.20563	0.97863	0.21013	4.75906	1.02184	4.86299	8
53	0.20592	0.97857	0.21043	4.75219	1.02190	4.85627	7
54	0.20620	0.97851	0.21073	4.74534	1.02196	4.84956	6
55	0.20649	0.97845	0.21104	4.73851	1.02203	4.84288	5
56	0.20677	0.97839	0.21134	4.73170	1.02209	4.83621	4
57	0.20706	0.97833	0.21164	4.72490	1.02215	4.82956	3
58	0.20734	0.97827	0.21195	4.71813	1.02221	4.82294	2
59	0.20763	0.97821	0.21225	4.71137	1.02228	4.81633	1
60	0.20791	0.97815	0.21256	4.70463	1.02234	4.80973	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

12°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.20791	0.97815	0.21256	4.70463	1.02234	4.80973	60
1	0.20820	0.97809	0.21286	4.69791	1.02240	4.80316	59
2	0.20848	0.97803	0.21316	4.69121	1.02247	4.79661	58
3	0.20877	0.97797	0.21347	4.68452	1.02253	4.79007	57
4	0.20905	0.97791	0.21377	4.67786	1.02259	4.78355	56
5	0.20933	0.97784	0.21408	4.67121	1.02266	4.77705	55
6	0.20962	0.97778	0.21438	4.66458	1.02272	4.77057	54
7	0.20990	0.97772	0.21469	4.65797	1.02279	4.76411	53
8	0.21019	0.97766	0.21499	4.65138	1.02285	4.75766	52
9	0.21047	0.97760	0.21529	4.64480	1.02291	4.75123	51
10	0.21076	0.97754	0.21560	4.63825	1.02298	4.74482	50
11	0.21104	0.97748	0.21590	4.63171	1.02304	4.73843	49
12	0.21132	0.97742	0.21621	4.62518	1.02311	4.73205	48
13	0.21161	0.97735	0.21651	4.61868	1.02317	4.72569	47
14	0.21189	0.97729	0.21682	4.61219	1.02323	4.71935	46
15	0.21218	0.97723	0.21712	4.60572	1.02330	4.71303	45
16	0.21246	0.97717	0.21743	4.59927	1.02336	4.70673	44
17	0.21275	0.97711	0.21773	4.59283	1.02343	4.70044	43
18	0.21303	0.97705	0.21804	4.58641	1.02349	4.69417	42
19	0.21331	0.97698	0.21834	4.58001	1.02356	4.68791	41
20	0.21360	0.97692	0.21864	4.57363	1.02362	4.68167	40
21	0.21388	0.97686	0.21895	4.56726	1.02369	4.67545	39
22	0.21417	0.97680	0.21925	4.56091	1.02375	4.66925	38
23	0.21445	0.97673	0.21956	4.55458	1.02382	4.66307	37
24	0.21474	0.97667	0.21986	4.54826	1.02388	4.65690	36
25	0.21502	0.97661	0.22017	4.54196	1.02395	4.65074	35
26	0.21530	0.97655	0.22047	4.53568	1.02402	4.64461	34
27	0.21559	0.97648	0.22078	4.52941	1.02408	4.63849	33
28	0.21587	0.97642	0.22109	4.52316	1.02415	4.63238	32
29	0.21616	0.97636	0.22139	4.51693	1.02421	4.62630	31
30	0.21644	0.97630	0.22169	4.51071	1.02428	4.62023	30
31	0.21672	0.97623	0.22200	4.50451	1.02435	4.61417	29
32	0.21701	0.97617	0.22231	4.49832	1.02441	4.60813	28
33	0.21729	0.97611	0.22261	4.49215	1.02448	4.60211	27
34	0.21758	0.97604	0.22292	4.48600	1.02454	4.59611	26
35	0.21786	0.97598	0.22322	4.47986	1.02461	4.59012	25
36	0.21814	0.97592	0.22353	4.47374	1.02468	4.58414	24
37	0.21843	0.97585	0.22383	4.46764	1.02474	4.57819	23
38	0.21871	0.97579	0.22414	4.46155	1.02481	4.57224	22
39	0.21899	0.97573	0.22444	4.45548	1.02488	4.56632	21
40	0.21928	0.97566	0.22475	4.44942	1.02494	4.56041	20
41	0.21956	0.97560	0.22505	4.44338	1.02501	4.55451	19
42	0.21985	0.97553	0.22536	4.43735	1.02508	4.54863	18
43	0.22013	0.97547	0.22567	4.43134	1.02515	4.54277	17
44	0.22041	0.97541	0.22597	4.42534	1.02521	4.53692	16
45	0.22070	0.97534	0.22628	4.41936	1.02528	4.53109	15
46	0.22098	0.97528	0.22658	4.41340	1.02535	4.52527	14
47	0.22126	0.97521	0.22689	4.40745	1.02542	4.51947	13
48	0.22155	0.97515	0.22719	4.40152	1.02548	4.51368	12
49	0.22183	0.97508	0.22750	4.39560	1.02555	4.50791	11
50	0.22212	0.97502	0.22781	4.38969	1.02562	4.50216	10
51	0.22240	0.97496	0.22811	4.38381	1.02569	4.49642	9
52	0.22268	0.97489	0.22842	4.37793	1.02576	4.49069	8
53	0.22297	0.97483	0.22872	4.37207	1.02582	4.48498	7
54	0.22325	0.97476	0.22903	4.36623	1.02589	4.47928	6
55	0.22353	0.97470	0.22934	4.36040	1.02596	4.47360	5
56	0.22382	0.97463	0.22964	4.35459	1.02603	4.46793	4
57	0.22410	0.97457	0.22995	4.34879	1.02610	4.46228	3
58	0.22438	0.97450	0.23026	4.34300	1.02617	4.45664	2
59	0.22467	0.97444	0.23056	4.33723	1.02624	4.45102	1
60	0.22495	0.97437	0.23087	4.33148	1.02630	4.44541	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

13 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.22495	0.97437	0.23087	4.33148	1.02630	4.44541	60
1	0.22523	0.97430	0.23117	4.32573	1.02637	4.43982	59
2	0.22552	0.97424	0.23148	4.32001	1.02644	4.43424	58
3	0.22580	0.97417	0.23179	4.31430	1.02651	4.42867	57
4	0.22608	0.97411	0.23209	4.30860	1.02658	4.42312	56
5	0.22637	0.97404	0.23240	4.30291	1.02665	4.41759	55
6	0.22665	0.97398	0.23271	4.29724	1.02672	4.41206	54
7	0.22693	0.97391	0.23301	4.29159	1.02679	4.40656	53
8	0.22722	0.97384	0.23332	4.28595	1.02686	4.40106	52
9	0.22750	0.97378	0.23363	4.28032	1.02693	4.39558	51
10	0.22778	0.97371	0.23393	4.27471	1.02700	4.39012	50
11	0.22807	0.97365	0.23424	4.26911	1.02707	4.38466	49
12	0.22835	0.97358	0.23455	4.26352	1.02714	4.37923	48
13	0.22863	0.97351	0.23485	4.25795	1.02721	4.37380	47
14	0.22892	0.97345	0.23516	4.25239	1.02728	4.36839	46
15	0.22920	0.97338	0.23547	4.24685	1.02735	4.36299	45
16	0.22948	0.97331	0.23578	4.24132	1.02742	4.35761	44
17	0.22977	0.97325	0.23608	4.23580	1.02749	4.35224	43
18	0.23005	0.97318	0.23639	4.23030	1.02756	4.34689	42
19	0.23033	0.97311	0.23670	4.22481	1.02763	4.34154	41
20	0.23062	0.97304	0.23700	4.21933	1.02770	4.33622	40
21	0.23090	0.97298	0.23731	4.21387	1.02777	4.33090	39
22	0.23118	0.97291	0.23762	4.20842	1.02784	4.32560	38
23	0.23146	0.97284	0.23793	4.20298	1.02791	4.32031	37
24	0.23175	0.97278	0.23823	4.19756	1.02799	4.31503	36
25	0.23203	0.97271	0.23854	4.19215	1.02806	4.30977	35
26	0.23231	0.97264	0.23885	4.18675	1.02813	4.30452	34
27	0.23260	0.97257	0.23916	4.18137	1.02820	4.29929	33
28	0.23288	0.97251	0.23946	4.17600	1.02827	4.29406	32
29	0.23316	0.97244	0.23977	4.17064	1.02834	4.28885	31
30	0.23345	0.97237	0.24008	4.16530	1.02842	4.28366	30
31	0.23373	0.97230	0.24039	4.15997	1.02849	4.27847	29
32	0.23401	0.97223	0.24069	4.15465	1.02856	4.27330	28
33	0.23429	0.97217	0.24100	4.14934	1.02863	4.26814	27
34	0.23458	0.97210	0.24131	4.14405	1.02870	4.26300	26
35	0.23486	0.97203	0.24162	4.13877	1.02878	4.25787	25
36	0.23514	0.97196	0.24193	4.13350	1.02885	4.25275	24
37	0.23542	0.97189	0.24223	4.12825	1.02892	4.24764	23
38	0.23571	0.97182	0.24254	4.12301	1.02899	4.24255	22
39	0.23599	0.97176	0.24285	4.11778	1.02907	4.23746	21
40	0.23627	0.97169	0.24316	4.11256	1.02914	4.23239	20
41	0.23656	0.97162	0.24347	4.10736	1.02921	4.22734	19
42	0.23684	0.97155	0.24377	4.10216	1.02928	4.22229	18
43	0.23712	0.97148	0.24408	4.09699	1.02936	4.21726	17
44	0.23740	0.97141	0.24439	4.09182	1.02943	4.21224	16
45	0.23769	0.97134	0.24470	4.08666	1.02950	4.20723	15
46	0.23797	0.97127	0.24501	4.08152	1.02958	4.20224	14
47	0.23825	0.97120	0.24532	4.07639	1.02965	4.19725	13
48	0.23853	0.97113	0.24562	4.07127	1.02972	4.19228	12
49	0.23882	0.97106	0.24593	4.06616	1.02980	4.18733	11
50	0.23910	0.97100	0.24624	4.06107	1.02987	4.18238	10
51	0.23938	0.97093	0.24655	4.05599	1.02994	4.17744	9
52	0.23966	0.97086	0.24686	4.05092	1.03002	4.17252	8
53	0.23995	0.97079	0.24717	4.04586	1.03009	4.16761	7
54	0.24023	0.97072	0.24747	4.04081	1.03017	4.16271	6
55	0.24051	0.97065	0.24778	4.03578	1.03024	4.15782	5
56	0.24079	0.97058	0.24809	4.03076	1.03032	4.15295	4
57	0.24108	0.97051	0.24840	4.02574	1.03039	4.14809	3
58	0.24136	0.97044	0.24871	4.02074	1.03046	4.14323	2
59	0.24164	0.97037	0.24902	4.01576	1.03054	4.13839	1
60	0.24192	0.97030	0.24933	4.01078	1.03061	4.13357	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

76 °

14 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.24192	0.97030	0.24933	4.01078	1.03061	4.13357	60
1	0.24220	0.97023	0.24964	4.00582	1.03069	4.12875	59
2	0.24249	0.97015	0.24995	4.00086	1.03076	4.12394	58
3	0.24277	0.97008	0.25026	3.99592	1.03084	4.11915	57
4	0.24305	0.97001	0.25056	3.99099	1.03091	4.11437	56
5	0.24333	0.96994	0.25087	3.98607	1.03099	4.10960	55
6	0.24362	0.96987	0.25118	3.98117	1.03106	4.10484	54
7	0.24390	0.96980	0.25149	3.97627	1.03114	4.10009	53
8	0.24418	0.96973	0.25180	3.97139	1.03121	4.09535	52
9	0.24446	0.96966	0.25211	3.96651	1.03129	4.09063	51
10	0.24474	0.96959	0.25242	3.96165	1.03137	4.08591	50
11	0.24503	0.96952	0.25273	3.95680	1.03144	4.08121	49
12	0.24531	0.96945	0.25304	3.95196	1.03152	4.07652	48
13	0.24559	0.96937	0.25335	3.94713	1.03159	4.07184	47
14	0.24587	0.96930	0.25366	3.94232	1.03167	4.06717	46
15	0.24615	0.96923	0.25397	3.93751	1.03175	4.06251	45
16	0.24644	0.96916	0.25428	3.93271	1.03182	4.05786	44
17	0.24672	0.96909	0.25459	3.92793	1.03190	4.05322	43
18	0.24700	0.96902	0.25490	3.92316	1.03197	4.04860	42
19	0.24728	0.96894	0.25521	3.91839	1.03205	4.04398	41
20	0.24756	0.96887	0.25552	3.91364	1.03213	4.03938	40
21	0.24784	0.96880	0.25583	3.90890	1.03220	4.03479	39
22	0.24813	0.96873	0.25614	3.90417	1.03228	4.03020	38
23	0.24841	0.96866	0.25645	3.89945	1.03236	4.02563	37
24	0.24869	0.96858	0.25676	3.89474	1.03244	4.02107	36
25	0.24897	0.96851	0.25707	3.89004	1.03251	4.01652	35
26	0.24925	0.96844	0.25738	3.88536	1.03259	4.01198	34
27	0.24954	0.96837	0.25769	3.88068	1.03267	4.00745	33
28	0.24982	0.96829	0.25800	3.87601	1.03275	4.00293	32
29	0.25010	0.96822	0.25831	3.87136	1.03282	3.99843	31
30	0.25038	0.96815	0.25862	3.86671	1.03290	3.99393	30
31	0.25066	0.96807	0.25893	3.86208	1.03298	3.98944	29
32	0.25094	0.96800	0.25924	3.85745	1.03306	3.98497	28
33	0.25122	0.96793	0.25955	3.85284	1.03313	3.98050	27
34	0.25151	0.96786	0.25986	3.84824	1.03321	3.97604	26
35	0.25179	0.96778	0.26017	3.84364	1.03329	3.97160	25
36	0.25207	0.96771	0.26048	3.83906	1.03337	3.96716	24
37	0.25235	0.96764	0.26079	3.83449	1.03345	3.96274	23
38	0.25263	0.96756	0.26110	3.82992	1.03353	3.95832	22
39	0.25291	0.96749	0.26141	3.82537	1.03360	3.95392	21
40	0.25320	0.96742	0.26172	3.82083	1.03368	3.94952	20
41	0.25348	0.96734	0.26203	3.81630	1.03376	3.94514	19
42	0.25376	0.96727	0.26235	3.81173	1.03384	3.64076	18
43	0.25404	0.96719	0.26266	3.80726	1.03392	3.93640	17
44	0.25432	0.96712	0.26297	3.80276	1.03400	3.93204	16
45	0.25460	0.96705	0.26328	3.79827	1.03408	3.92770	15
46	0.25488	0.96697	0.26359	3.79378	1.03416	3.92337	14
47	0.25516	0.96690	0.26390	3.78931	1.03424	3.91904	13
48	0.25545	0.96682	0.26421	3.78485	1.03432	3.91473	12
49	0.25573	0.96675	0.26452	3.78040	1.03439	3.91042	11
50	0.25601	0.96667	0.26483	3.77595	1.03447	3.90613	10
51	0.25629	0.96660	0.26515	3.77152	1.03455	3.90184	9
52	0.25657	0.96653	0.26546	3.76709	1.03463	3.89756	8
53	0.25685	0.96645	0.26577	3.76268	1.03471	3.89330	7
54	0.25713	0.96638	0.26608	3.75828	1.03479	3.88904	6
55	0.25741	0.96630	0.26639	3.75388	1.03487	3.88479	5
56	0.25769	0.96623	0.26670	3.74950	1.03495	3.88056	4
57	0.25798	0.96615	0.26701	3.74512	1.03503	3.87633	3
58	0.25826	0.96608	0.26733	3.74075	1.03511	3.87211	2
59	0.25854	0.96600	0.26764	3.73640	1.03520	3.86790	1
60	0.25882	0.96593	0.26795	3.73205	1.03528	3.86370	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

75 °

15°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.25882	0.96593	0.26795	3.73205	1.03528	3.86370	60
1	0.25910	0.96585	0.26826	3.72771	1.03536	3.85951	59
2	0.25938	0.96578	0.26857	3.72338	1.03544	3.85533	58
3	0.25966	0.96570	0.26888	3.71907	1.03552	3.85116	57
4	0.25994	0.96562	0.26920	3.71476	1.03560	3.84700	56
5	0.26022	0.96355	0.26951	3.71046	1.03568	3.84285	55
6	0.26050	0.96547	0.26982	3.70616	1.03576	3.83871	54
7	0.26079	0.96540	0.27013	3.70188	1.03584	3.83457	53
8	0.26107	0.96532	0.27044	3.69761	1.03592	3.83045	52
9	0.26135	0.96524	0.27076	3.69335	1.03601	3.82633	51
10	0.26163	0.96517	0.27107	3.68909	1.03609	3.82223	50
11	0.26191	0.96509	0.27138	3.68485	1.03617	3.81813	49
12	0.26219	0.96502	0.27169	3.68061	1.03625	3.81404	48
13	0.26247	0.96494	0.27201	3.67638	1.03633	3.80996	47
14	0.26275	0.96486	0.27232	3.67217	1.03642	3.80589	46
15	0.26303	0.96479	0.27263	3.66796	1.03650	3.80183	45
16	0.26331	0.96471	0.27294	3.66376	1.03658	3.79778	44
17	0.26359	0.96463	0.27326	3.65957	1.03666	3.79374	43
18	0.26387	0.96456	0.27357	3.65538	1.03674	3.78970	42
19	0.26415	0.96448	0.27388	3.65121	1.03683	3.78568	41
20	0.26443	0.96440	0.27419	3.64705	1.03691	3.78166	40
21	0.26471	0.96433	0.27451	3.64289	1.03699	3.77765	39
22	0.26500	0.96425	0.27482	3.63874	1.03708	3.77365	38
23	0.26528	0.96417	0.27513	3.63461	1.03716	3.76966	37
24	0.26556	0.96410	0.27545	3.63048	1.03724	3.76568	36
25	0.26584	0.96402	0.27576	3.62636	1.03732	3.76171	35
26	0.26612	0.96394	0.27607	3.62224	1.03741	3.75775	34
27	0.26640	0.96386	0.27638	3.61814	1.03749	3.75379	33
28	0.26668	0.96379	0.27670	3.61405	1.03757	3.74984	32
29	0.26696	0.96371	0.27701	3.60996	1.03766	3.74591	31
30	0.26724	0.96363	0.27732	3.60588	1.03774	3.74198	30
31	0.26752	0.96355	0.27764	3.60181	1.03783	3.73806	29
32	0.26780	0.96347	0.27795	3.59775	1.03791	3.73414	28
33	0.26808	0.96340	0.27826	3.59370	1.03799	3.73024	27
34	0.26836	0.96332	0.27858	3.58966	1.03808	3.72633	26
35	0.26864	0.96324	0.27889	3.58562	1.03816	3.72246	25
36	0.26892	0.96316	0.27921	3.58160	1.03825	3.71858	24
37	0.26920	0.96308	0.27952	3.57758	1.03833	3.71471	23
38	0.26948	0.96301	0.27983	3.57357	1.03842	3.71085	22
39	0.26976	0.96293	0.28015	3.56957	1.03850	3.70700	21
40	0.27004	0.96285	0.28046	3.56557	1.03858	3.70315	20
41	0.27032	0.96277	0.28077	3.56159	1.03867	3.69931	19
42	0.27060	0.96269	0.28109	3.55761	1.03875	3.69549	18
43	0.27088	0.96261	0.28140	3.55364	1.03884	3.69167	17
44	0.27116	0.96253	0.28172	3.54968	1.03892	3.68785	16
45	0.27144	0.96246	0.28203	3.54573	1.03901	3.68405	15
46	0.27172	0.96238	0.28234	3.54179	1.03909	3.68025	14
47	0.27200	0.96230	0.28266	3.53785	1.03918	3.67647	13
48	0.27228	0.96222	0.28297	3.53393	1.03927	3.67269	12
49	0.27256	0.96214	0.28329	3.53001	1.03935	3.66892	11
50	0.27284	0.96206	0.28360	3.52609	1.03944	3.66515	10
51	0.27312	0.96198	0.28391	3.52219	1.03952	3.66140	9
52	0.27340	0.96190	0.28423	3.51829	1.03961	3.65765	8
53	0.27368	0.96182	0.28454	3.51441	1.03969	3.65391	7
54	0.27396	0.96174	0.28488	3.51053	1.03978	3.65018	6
55	0.27424	0.96166	0.28517	3.50666	1.03987	3.64645	5
56	0.27452	0.96158	0.28549	3.50279	1.03995	3.64274	4
57	0.27480	0.96150	0.28580	3.49894	1.04004	3.63903	3
58	0.27508	0.96142	0.28612	3.49509	1.04013	3.63533	2
59	0.27536	0.96134	0.28643	3.49125	1.04021	3.63164	1
60	0.27564	0.96126	0.28675	3.48741	1.04030	3.62796	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

74°

16°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.27564	0.96126	0.28675	3.48741	1.04030	3.62796	60
1	0.27592	0.96118	0.28708	3.48359	1.04039	3.62428	59
2	0.27620	0.96110	0.28738	3.47977	1.04047	3.62061	58
3	0.27648	0.96102	0.28769	3.47596	1.04056	3.61695	57
4	0.27676	0.96094	0.28801	3.47216	1.04065	3.61330	56
5	0.27704	0.96086	0.28832	3.46837	1.04073	3.60965	55
6	0.27731	0.96078	0.28864	3.46458	1.04082	3.60601	54
7	0.27759	0.96070	0.28895	3.46080	1.04091	3.60238	53
8	0.27787	0.96062	0 28927	3.45703	1.04100	3.59876	52
9	0.27815	0.96054	0.28958	3.45327	1.04108	3.59514	51
10	0.27843	0.96046	0.28990	3.44951	1.04117	3.59154	50
11	0.27871	0.96037	0.29021	3.44576	1.04126	3.58794	49
12	0.27899	0.96029	0.29053	3.44202	1.04135	3.58434	48
13	0.27927	0.96021	0.29084	3.43829	1.04144	3.58076	47
14	0.27955	0.96013	0.29116	3.43456	1.04152	3.57718	46
15	0.27983	0.96005	0.29147	3.43084	1.04161	3.57361	45
16	0.28011	0.95997	0 29179	3.42713	1.04170	3.57005	44
17	0.28039	0.95989	0.29210	3.42343	1.04179	3.56649	43
18	0.28067	0.95981	0.29242	3.41973	1.04188	3.56294	42
19	0.28095	0.95972	0.29274	3.41604	1.04197	3.55940	41
20	0.28123	0.95964	0.29305	3.41236	1.04206	3.55587	40
21	0.28150	0.95956	0.29337	3.40869	1.04214	3.55234	39
22	0.28178	0.95948	0.29368	3.40502	1.04223	3.54883	38
23	0.28206	0.95940	0.29400	3.40136	1.04232	3.54531	37
24	0.28234	0.95931	0.29432	3.39771	1.04241	3.54181	36
25	0.28262	0.95923	0.29463	3.39406	1.04250	3.53831	35
26	0.28290	0.95915	0.29495	3.39042	1.04259	3.53482	34
27	0.28318	0.95907	0.29526	3.38679	1.04268	3.53134	33
28	0.28346	0.95898	0.29558	3.38317	1.04277	3.52787	32
29	0.28374	0.95890	0.29590	3.37955	1.04286	3.52440	31
30	0.28402	0.95882	0.29621	3.37594	1.04295	3.52094	30
31	0.28429	0.95874	0.29653	3.37234	1.04304	3.51748	29
32	0.28457	0.95865	0.29685	3.36875	1.04313	3.51404	28
33	0.28485	0.95857	0.29716	3.36516	1.04322	3.51060	27
34	0.28513	0.95849	0.29748	3.36158	1.04331	3.50716	26
35	0.28541	0.95841	0.29780	3.35800	1.04340	3.50374	25
36	0.28569	0.95832	0.29811	3.35443	1.04349	3.50032	24
37	0.28597	0.95824	0.29843	3.35087	1.04358	3.49891	23
38	0.28625	0.95816	0.29875	3.34732	1.04367	3.49350	22
39	0.28652	0.95807	0.29906	3.34377	1.04376	3.49010	21
40	0.28680	0.95799	0.29938	3.34023	1 04385	3.48671	20
41	0.28708	0.95791	0.29970	3.33670	1.04394	3.48333	19
42	0.28736	0.95782	0.30001	3.33317	1.04403	3.47995	18
43	0.28764	0.95774	0.30033	3.32965	1.04413	3.47658	17
44	0.28792	0.95766	0 30065	3.32614	1.04422	3.47321	16
45	0.28820	0.95757	0.30097	3.32264	1.04431	3.46986	15
46	0.28847	0.95749	0.30128	3.31914	1.04440	3.46651	14
47	0.28875	0.95740	0.30160	3.31565	1.04449	3.46316	13
48	0.28903	0.95732	0.30192	3.31216	1.04458	3.45983	12
49	0.28931	0.95724	0.30224	3.30868	1.04468	3.45650	11
50	0.28959	0.95715	0.30255	3.30521	1.04477	3.45317	10
51	0.28987	0.95707	0.30287	3.30174	1.04486	3.44986	9
52	0.29015	0.95698	0.30319	3.29829	1.04495	3.44655	8
53	0.29042	0.95690	0.30351	3.29483	1.04504	3.44324	7
54	0.29070	0.95681	0.30382	3.29139	1.04514	3.43995	6
55	0.29098	0.95673	0.30414	3.28795	1.04523	3.43666	5
56	0.29126	0.95664	0.30446	3.28452	1.04532	3.43337	4
57	0.29154	0.95656	0.30478	3.28109	1.04541	3.43010	3
58	0.29182	0.95647	0.30509	3.27767	1.04551	3.42683	2
59	0.29209	0.95639	0.30541	3.27426	1.04560	3.42356	1
60	0.29237	0.95630	0.30573	3.27085	1.04569	3.42030	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

17°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.29237	0.95630	0.30573	3.27085	1.04569	3.42030	60
1	0.29265	0.95622	0.30603	3.26745	1.04578	3.41705	59
2	0.29293	0.95613	0 30637	3.26406	1.04588	3.41381	58
3	0.29321	0.95605	0.30669	3.26067	1.04597	3.41057	57
4	0.29348	0 95596	0.30700	3.25729	1 04606	3.40734	56
5	0.29376	0.95588	0.30732	3.25392	1.04616	3.40411	55
6	0.29404	0.95579	0.30764	3.25055	1.04625	3.40089	54
7	0.29432	0.95571	0.30796	3.24719	1.04635	3.39768	53
8	0.29460	0.95562	0.30828	3.24383	1.04644	3.39448	52
9	0.29487	0.95554	0.30860	3.24049	1.04653	3.39128	51
10	0 29515	0.95545	0.30891	3.23714	1.04663	3.38808	50
11	0.29543	0.95536	0.30923	3.23381	1.04672	3.38489	49
12	0.29571	0.95528	0.30955	3.23048	1 04682	3.38171	48
13	0.29599	0.95519	0.30987	3.22715	1.04691	3.37854	47
14	0.29626	0.95511	0.31019	3.22384	1.04700	3.37537	46
15	0.29654	0.95502	0.31051	3.22053	1.04710	3.37221	45
16	0.29682	0.95493	0.31083	3.21722	1.04719	3.36905	44
17	0.29710	0.95485	0.31115	3.21392	1.04729	3.36590	43
18	0.29737	0.95476	0.31147	3.21063	1.04738	3.36276	42
19	0.29765	0.95467	0.31178	3.20734	1.04748	3.35962	41
20	0.29793	0.95459	0.31210	3.20406	1.04757	3.35649	40
21	0.29821	0.95450	0.31242	3.20079	1.04767	3.35336	39
22	0.29849	0.95441	0.31274	3.19752	1.04776	3.35025	38
23	0.29876	0.95433	0.31306	3.19426	1.04786	3.34713	37
24	0.29904	0.95424	0.31338	3.19100	1.04795	3.34403	36
25	0.29932	0.95415	0 31370	3.18775	1.04805	3.34092	35
26	0.29960	0.95407	0.31402	3.18451	1.04815	3.33783	34
27	0.29987	0.95398	0.31434	3.18127	1.04824	3.33474	33
28	0.30015	0.95389	0.31466	3.17804	1.04834	3.33166	32
29	0.30043	0.95380	0.31498	3.17481	1.04843	3.32858	31
30	0.30071	0.95372	0.31530	3.17159	1.04853	3.32551	30
31	0.30098	0.95363	0.31562	3.16838	1.04863	3.32244	29
32	0.30126	0.95354	0.31594	3.16517	1.04872	3.31939	28
33	0.30154	0 95345	0.31626	3.16197	1.04882	3.31635	27
34	0.30182	0.95337	0.31658	3.15877	1.04891	3.31328	26
35	0.30209	0.95328	0.31690	3.15558	1.04901	3.31024	25
36	0.30237	0.95319	0.31722	3.15240	1.04911	3.30721	24
37	0.30265	0.95310	0.31754	3.14922	1.04920	3.30418	23
38	0.30292	0.95301	0.31786	3.14605	1 04930	3.30115	22
39	0.30320	0.95293	0.31818	3.14288	1.04940	3.29814	21
40	0.30348	0.95284	0.31850	3.13972	1.04950	3.29512	20
41	0.30376	0.95275	0.31882	3.13656	1.04959	3.29212	19
42	0.30403	0.95266	0.31914	3.13341	1.04969	3.28912	18
43	0.30431	0.95257	0 31946	3.13027	1.04979	3.28612	17
44	0.30459	0.95248	0.31978	3.12713	1.04989	3.28313	16
45	0.30486	0.95240	0.32010	3.12400	1.04998	3.28015	15
46	0.30514	0 95231	0.32042	3.12087	1.05008	3 27717	14
47	0.30542	0.95222	0.32074	3.11775	1.05018	3.27420	13
48	0.30570	0.95213	0.32106	3.11464	1.05028	3.27123	12
49	0.30597	0.95204	0.32139	3.11153	1.05038	3.26827	11
50	0.30625	0.95195	0.32171	3.10842	1.05047	3.26531	10
51	0.30653	0.95186	0.32203	3.10532	1.05057	3.26237	9
52	0.30680	0.95177	0.32235	3.10223	1.05067	3.25942	8
53	0.30708	0.95168	0.32267	3.09914	1.05077	3.25648	7
54	0.30736	0.95159	0.32299	3.09606	1.05087	3.25355	6
55	0.30763	0.95150	0.32331	3.09298	1.05097	3.25062	5
56	0.30791	0 95142	0.32363	3.08991	1.05107	3.24770	4
57	0.30819	0.95133	0.32396	3.08685	1.05116	3.24478	3
58	0.30846	0.95124	0.32428	3.08379	1.05126	3.24187	2
59	0.30874	0.95115	0.32460	3.08073	1.05136	3.23897	1
60	0.30902	0.95106	0.32492	3.07768	1.05146	3.23607	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

18.9

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.30902	0.95106	0.32492	3.07768	1.05146	3.23607	60
1	0.30929	0.95097	0.32534	3.07464	1.05156	3.23317	59
2	0.30957	0.95088	0.32576	3.07160	1.05166	3.23028	58
3	0.30985	0.95079	0.32618	3.06857	1.05176	3.22740	57
4	0.31012	0.95070	0.32661	3.06554	1.05186	3.22452	56
5	0.31040	0.95061	0.32653	3.06252	1.05196	3.22165	55
6	0.31068	0.95052	0.32685	3.05950	1.05206	3.21878	54
7	0.31095	0.95043	0.32717	3.05649	1.05216	3.21592	53
8	0.31123	0.95033	0.32749	3.05349	1.05226	3.21306	52
9	0.31151	0.95024	0.32782	3.05049	1.05236	3.21021	51
10	0.31178	0.95015	0.32814	3.04749	1.05246	3.20737	50
11	0.31206	0.95006	0.32846	3.04450	1.05256	3.20453	49
12	0.31233	0.94997	0.32878	3.04152	1.05266	3.20169	48
13	0.31261	0.94988	0.32911	3.03854	1.05276	3.19886	47
14	0.31289	0.94979	0.32943	3.03556	1.05286	3.19604	46
15	0.31316	0.94970	0.32975	3.03260	1.05297	3.19322	45
16	0.31344	0.94961	0.33007	3.02963	1.05307	3.19040	44
17	0.31372	0.94952	0.33040	3.02667	1.05317	3.18759	43
18	0.31399	0.94943	0.33072	3.02372	1.05327	3.18479	42
19	0.31427	0.94933	0.33104	3.02077	1.05337	3.18199	41
20	0.31454	0.94924	0.33136	3.01783	1.05347	3.17920	40
21	0.31482	0.94915	0.33169	3.01489	1.05357	3.17641	39
22	0.31510	0.94906	0.33201	3.01196	1.05367	3.17363	38
23	0.31537	0.94897	0.33233	3.00903	1.05378	3.17085	37
24	0.31565	0.94888	0.33266	3.00611	1.05388	3.16808	36
25	0.31593	0.94878	0.33298	3.00319	1.05398	3.16531	35
26	0.31620	0.94869	0.33330	3.00028	1.05408	3.16255	34
27	0.31648	0.94860	0.33363	2.99738	1.05418	3.15979	33
28	0.31675	0.94851	0.33395	2.99447	1.05429	3.15704	32
29	0.31703	0.94842	0.33427	2.99158	1.05439	3.15429	31
30	0.31730	0.94832	0.33460	2.98868	1.05449	3.15155	30
31	0.31758	0.94823	0.33492	2.98580	1.05459	3.14881	29
32	0.31786	0.94814	0.33524	2.98292	1.05470	3.14608	28
33	0.31813	0.94805	0.33557	2.98004	1.05480	3.14335	27
34	0.31841	0.94795	0.33589	2.97717	1.05490	3.14062	26
35	0.31868	0.94786	0.33621	2.97430	1.05501	3.13791	25
36	0.31896	0.94777	0.33654	2.97144	1.05511	3.13520	24
37	0.31923	0.94768	0.33686	2.96858	1.05521	3.13249	23
38	0.31951	0.94758	0.33718	2.96573	1.05532	3.12979	22
39	0.31979	0.94749	0.33751	2.96288	1.05542	3.12709	21
40	0.32006	0.94740	0.33783	2.96004	1.05552	3.12440	20
41	0.32034	0.94730	0.33816	2.95721	1.05563	3.12171	19
42	0.32061	0.94721	0.33848	2.95437	1.05573	3.11903	18
43	0.32089	0.94712	0.33881	2.95155	1.05584	3.11635	17
44	0.32116	0.94702	0.33913	2.94872	1.05594	3.11367	16
45	0.32144	0.94693	0.33945	2.94591	1.05604	3.11101	15
46	0.32171	0.94684	0.33978	2.94309	1.05615	3.10834	14
47	0.32199	0.94674	0.34010	2.94028	1.05625	3.10568	13
48	0.32227	0.94665	0.34043	2.93748	1.05636	3.10303	12
49	0.32254	0.94656	0.34075	2.93468	1.05646	3.10038	11
50	0.32282	0.94646	0.34108	2.93189	1.05657	3.09774	10
51	0.32309	0.94637	0.34140	2.92910	1.05667	3.09510	9
52	0.32337	0.94627	0.34173	2.92632	1.05678	3.09246	8
53	0.32364	0.94618	0.34205	2.92354	1.05688	3.08983	7
54	0.32392	0.94609	0.34238	2.92076	1.05699	3.08721	6
55	0.32419	0.94599	0.34270	2.91799	1.05709	3.08459	5
56	0.32447	0.94590	0.34303	2.91523	1.05720	3.08197	4
57	0.32474	0.94580	0.34335	2.91246	1.05730	3.07936	3
58	0.32502	0.94571	0.34368	2.90971	1.05741	3.07675	2
59	0.32529	0.94561	0.34400	2.90696	1.05751	3.07415	1
60	0.32557	0.94552	0.34433	2.90421	1.05762	3.07155	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

19°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.32557	0.94552	0.34433	2.90421	1.05762	3.07155	60
1	0.32584	0.94542	0.34467	2.90147	1.05773	3.06996	59
2	0.32612	0.94533	0.34498	2.89873	1.05783	3.06837	58
3	0.32639	0.94523	0.34530	2.89600	1.05794	3.06679	57
4	0.32667	0.94514	0.34565	2.89327	1.05805	3.06521	56
5	0.32694	0.94504	0.34596	2.89053	1.05815	3.05864	55
6	0.32722	0.94495	0.34628	2.88783	1.05826	3.05607	54
7	0.32749	0.94485	0.34661	2.88511	1.05836	3.05370	53
8	0.32777	0.94476	0.34693	2.88240	1.05847	3.05094	52
9	0.32804	0.94466	0.34726	2.87970	1.05858	3.04839	51
10	0.32832	0.94457	0.34758	2.87700	1.05869	3.04584	50
11	0.32859	0.94447	0.34791	2.87430	1.05879	3.04329	49
12	0.32887	0.94438	0.34824	2.87161	1.05890	3.04075	48
13	0.32914	0.94428	0.34856	2.86892	1.05901	3.03821	47
14	0.32942	0.94418	0.34889	2.86624	1.05911	3.03568	46
15	0.32969	0.94409	0.34922	2.86356	1.05922	3.03315	45
16	0.32997	0.94399	0.34954	2.86089	1.05933	3.03062	44
17	0.33024	0.94390	0.34987	2.85822	1.05944	3.02810	43
18	0.33051	0.94380	0.35020	2.85555	1.05955	3.02559	42
19	0.33079	0.94370	0.35052	2.85289	1.05965	3.02308	41
20	0.33106	0.94361	0.35085	2.85023	1.05976	3.02057	40
21	0.33134	0.94351	0.35118	2.84758	1.05987	3.01807	39
22	0.33161	0.94342	0.35150	2.84494	1.05998	3.01557	38
23	0.33189	0.94332	0.35183	2.84229	1.06009	3.01308	37
24	0.33216	0.94322	0.35216	2.83965	1.06020	3.01059	36
25	0.33244	0.94313	0.35248	2.83702	1.06030	3.00810	35
26	0.33271	0.94303	0.35281	2.83439	1.06041	3.00561	34
27	0.33298	0.94293	0.35314	2.83176	1.06052	3.00313	33
28	0.33326	0.94284	0.35346	2.82914	1.06063	3.00067	32
29	0.33353	0.94274	0.35379	2.82653	1.06074	2.99821	31
30	0.33381	0.94264	0.35412	2.82391	1.06085	2.99574	30
31	0.33408	0.94254	0.35445	2.82130	1.06096	2.99329	29
32	0.33436	0.94245	0.35477	2.81870	1.06107	2.99083	28
33	0.33463	0.94235	0.35510	2.81610	1.06118	2.98838	27
34	0.33490	0.94225	0.35543	2.81350	1.06129	2.98594	26
35	0.33518	0.94215	0.35576	2.81091	1.06140	2.98349	25
36	0.33545	0.94206	0.35608	2.80832	1.06151	2.98106	24
37	0.33573	0.94196	0.35641	2.80574	1.06162	2.97862	23
38	0.33600	0.94186	0.35674	2.80316	1.06173	2.97619	22
39	0.33627	0.94176	0.35707	2.80059	1.06184	2.97377	21
40	0.33655	0.94167	0.35740	2.79802	1.06195	2.97135	20
41	0.33682	0.94157	0.35772	2.79545	1.06206	2.96893	19
42	0.33710	0.94147	0.35805	2.79289	1.06217	2.96652	18
43	0.33737	0.94137	0.35838	2.79033	1.06228	2.96411	17
44	0.33764	0.94127	0.35871	2.78778	1.06239	2.96171	16
45	0.33792	0.94118	0.35904	2.78523	1.06250	2.95931	15
46	0.33819	0.94108	0.35937	2.78269	1.06261	2.95691	14
47	0.33846	0.94098	0.35969	2.78014	1.06272	2.95452	13
48	0.33874	0.94088	0.36002	2.77762	1.06283	2.95213	12
49	0.33901	0.94078	0.36035	2.77507	1.06295	2.94975	11
50	0.33929	0.94068	0.36068	2.77254	1.06306	2.94737	10
51	0.33956	0.94058	0.36101	2.77002	1.06317	2.94500	9
52	0.33983	0.94049	0.36134	2.76750	1.06328	2.94263	8
53	0.34011	0.94039	0.36167	2.76498	1.06339	2.94026	7
54	0.34038	0.94029	0.36199	2.76247	1.06350	2.93790	6
55	0.34065	0.94019	0.36232	2.75996	1.06362	2.93554	5
56	0.34093	0.94009	0.36265	2.75746	1.06373	2.93318	4
57	0.34120	0.93999	0.36298	2.75496	1.06384	2.93083	3
58	0.34147	0.93989	0.36331	2.75246	1.06395	2.92849	2
59	0.34175	0.93979	0.36364	2.74997	1.06407	2.92614	1
60	0.34202	0.93969	0.36397	2.74748	1.06418	2.92380	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

20°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.34202	0.93969	0.36397	2.74748	1.06418	2.92380	60
1	0.34229	0.93959	0.36430	2.74499	1.06429	2.92147	59
2	0.34257	0.93949	0.36463	2.74251	1.06440	2.91914	58
3	0.34284	0.93939	0.36496	2.74004	1.06452	2.91681	57
4	0.34311	0.93929	0.36529	2.73756	1.06463	2.91449	56
5	0.34339	0.93919	0.36562	2.73509	1.06474	2.91217	55
6	0.34366	0.93909	0.36595	2.73263	1.06486	2.90986	54
7	0.34393	0.93899	0.36628	2.73017	1.06497	2.90754	53
8	0.34421	0.93889	0.36661	2.72771	1.06508	2.90524	52
9	0.34448	0.93879	0.36694	2.72526	1.06520	2.90293	51
10	0.34475	0.93869	0.36727	2.72281	1.06531	2.90063	50
11	0.34503	0.93859	0.36760	2.72036	1.06542	2.89834	49
12	0.34530	0.93849	0.36793	2.71792	1.06554	2.89605	48
13	0.34557	0.93839	0.36826	2.71548	1.06565	2.89376	47
14	0.34584	0.93829	0.36859	2.71305	1.06577	2.89148	46
15	0.34612	0.93819	0.36892	2.71062	1.06588	2.88920	45
16	0.34639	0.93809	0.36925	2.70819	1.06600	2.88692	44
17	0.34666	0.93799	0.36958	2.70577	1.06611	2.88465	43
18	0.34694	0.93789	0.36991	2.70335	1.06622	2.88238	42
19	0.34721	0.93779	0.37024	2.70094	1.06634	2.88011	41
20	0.34748	0.93769	0.37057	2.69853	1.06645	2.87785	40
21	0.34775	0.93759	0.37090	2.69612	1.06657	2.87560	39
22	0.34803	0.93748	0.37123	2.69371	1.06668	2.87334	38
23	0.34830	0.93738	0.37157	2.69131	1.06680	2.87109	37
24	0.34857	0.93728	0.37190	2.68892	1.06691	2.86885	36
25	0.34884	0.93718	0.37223	2.68653	1.06703	2.86661	35
26	0.34912	0.93708	0.37256	2.68414	1.06715	2.86437	34
27	0.34939	0.93698	0.37289	2.68175	1.06726	2.86213	33
28	0.34966	0.93688	0.37322	2.67937	1.06738	2.85990	32
29	0.34993	0.93677	0.37355	2.67700	1.06749	2.85767	31
30	0.35021	0.93667	0.37388	2.67462	1.06761	2.85545	30
31	0.35048	0.93657	0.37422	2.67225	1.06773	2.85323	29
32	0.35075	0.93647	0.37455	2.66989	1.06784	2.85102	28
33	0.35102	0.93637	0.37488	2.66752	1.06796	2.84880	27
34	0.35130	0.93626	0.37521	2.66516	1.06807	2.84659	26
35	0.35157	0.93616	0.37554	2.66281	1.06819	2.84439	25
36	0.35184	0.93606	0.37588	2.66046	1.06831	2.84219	24
37	0.35211	0.93596	0.37621	2.65811	1.06842	2.83999	23
38	0.35239	0.93585	0.37654	2.65576	1.06854	2.83780	22
39	0.35266	0.93575	0.37687	2.65342	1.06866	2.83561	21
40	0.35293	0.93565	0.37720	2.65109	1.06878	2.83342	20
41	0.35320	0.93555	0.37754	2.64875	1.06889	2.83124	19
42	0.35347	0.93544	0.37787	2.64642	1.06901	2.82906	18
43	0.35375	0.93534	0.37820	2.64410	1.06913	2.82688	17
44	0.35402	0.93524	0.37853	2.64177	1.06925	2.82471	16
45	0.35429	0.93514	0.37887	2.63945	1.06936	2.82254	15
46	0.35456	0.93503	0.37920	2.63714	1.06948	2.82037	14
47	0.35484	0.93493	0.37953	2.63483	1.06960	2.81821	13
48	0.35511	0.93483	0.37986	2.63252	1.06972	2.81605	12
49	0.35538	0.93472	0.38020	2.63021	1.06984	2.81390	11
50	0.35565	0.93462	0.38053	2.62791	1.06995	2.81175	10
51	0.35592	0.93452	0.38086	2.62561	1.07007	2.80960	9
52	0.35619	0.93441	0.38120	2.62332	1.07019	2.80746	8
53	0.35647	0.93431	0.38153	2.62103	1.07031	2.80531	7
54	0.35674	0.93420	0.38186	2.61874	1.07043	2.80318	6
55	0.35701	0.93410	0.38220	2.61646	1.07055	2.80104	5
56	0.35728	0.93400	0.38253	2.61418	1.07067	2.79891	4
57	0.35755	0.93389	0.38286	2.61190	1.07079	2.79679	3
58	0.35782	0.93379	0.38320	2.60963	1.07091	2.79466	2
59	0.35810	0.93368	0.38353	2.60736	1.07103	2.79254	1
60	0.35837	0.93358	0.38386	2.60509	1.07114	2.79043	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

21 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.35837	0.93358	0.38386	2.60509	1.07114	2.79043	60
1	0.35864	0.93348	0.38420	2.60283	1.07126	2.78838	59
2	0.35891	0.93337	0.38453	2.60057	1.07138	2.78621	58
3	0.35918	0.93327	0.38487	2.59831	1.07150	2.78410	57
4	0.35945	0.93316	0.38520	2.59606	1.07162	2.78200	56
5	0.35973	0.93306	0.38553	2.59381	1.07174	2.77990	55
6	0.36000	0.93295	0.38587	2.59156	1.07186	2.77780	54
7	0.36027	0.93285	0.38620	2.58932	1.07199	2.77571	53
8	0.36054	0.93274	0.38654	2.58708	1.07211	2.77362	52
9	0.36081	0.93264	0.38687	2.58484	1 07223	2.77154	51
10	0.36108	0.93253	0.38721	2.58261	1.07235	2.76945	50
11	0.36135	0.93243	0.38754	2.58038	1.07247	2.76737	49
12	0.36162	0.93232	0.38787	2.57815	1.07259	2.76530	48
13	0.36190	0.93222	0.38821	2.57593	1.07271	2.76323	47
14	0.36217	0.93211	0.38854	2.57371	1.07283	2.76116	46
15	0.36244	0.93201	0.38888	2.57150	1.07295	2.75909	45
16	0.36271	0.93190	0.38921	2.56928	1.07307	2.75703	44
17	0.36298	0.93180	0 38955	2.56707	1.07320	2.75497	43
18	0.36325	0.93169	0.38988	2.56487	1.07332	2.75292	42
19	0.36352	0.93159	0.39022	2.56266	1.07344	2.75086	41
20	0.36379	0.93148	0.39055	2.56046	1.07356	2.74881	40
21	0.36406	0.93137	0.39089	2.55827	1.07368	2.74677	39
22	0.36434	0.93127	0.39122	2.55608	1.07380	2.74473	38
23	0.36461	0.93116	0.39156	2.55389	1.07393	2.74269	37
24	0.36488	0.93106	0.39190	2.55170	1.07405	2.74065	36
25	0.36515	0.93095	0.39223	2 54952	1.07417	2.73862	35
26	0.36542	0.93084	0.39257	2.54734	1.07429	2.73659	34
27	0.36569	0.93074	0.39290	2.54516	1.07442	2 73456	33
28	0.36596	0.93063	0.39324	2.54299	1.07454	2.73254	32
29	0.36623	0.93052	0.39357	2 54082	1.07466	2.73052	31
30	0.36650	0 93042	0.39391	2.53865	1.07479	2.72850	30
31	0.36677	0.93031	0.39425	2.53648	1.07491	2.72649	29
32	0.36704	0.93020	0.39458	2.53432	1.07503	2.72448	28
33	0.36731	0.93010	0.39492	2.53217	1.07516	2.72247	27
34	0.36758	0.92999	0.39526	2.53001	1.07528	2.72047	26
35	0.36785	0.92988	0.39559	2.52786	1.07540	2.71847	25
36	0.36812	0.92978	0.39593	2.52571	1.07553	2.71647	24
37	0.36839	0.92967	0.39626	2.52357	1.07565	2.71448	23
38	0.36867	0.92956	0.39660	2.52142	1.07578	2.71249	22
39	0.36894	0.92945	0.39694	2.51929	1.07590	2.71050	21
40	0.36921	0.92935	0.39727	2.51715	1.07602	2.70851	20
41	0.36948	0.92924	0.39761	2.51502	1.07615	2.70653	19
42	0.36975	0.92913	0.39795	2.51289	1.07627	2.70455	18
43	0.37002	0.92902	0.39829	2 51076	1.07640	2.70258	17
44	0.37029	0.92892	0.39862	2.50864	1.07652	2.70061	16
45	0.37056	0.92881	0.39896	2.50652	1.07665	2.69864	15
46	0.37083	0.92870	0.39930	2.50440	1.07677	2.69667	14
47	0.37110	0 92859	0.39963	2.50229	1.07690	2.69471	13
48	0.37137	0 92849	0.39997	2.50018	1.07702	2.69275	12
49	0.37164	0.92838	0.40031	2.49807	1.07715	2.69079	11
50	0.37191	0.92827	0.40065	2.49597	1.07727	2.68884	10
51	0.37218	0.92816	0.40098	2.49386	1.07740	2.68689	9
52	0.37245	0.92805	0.40132	2.49177	1.07752	2.68494	8
53	0.37272	0.92794	0.40166	2.48967	1.07765	2.68299	7
54	0.37299	0.92784	0.40200	2.48758	1.07778	2.68105	6
55	0.37326	0.92773	0.40234	2.48549	1.07790	2.67911	5
56	0.37353	0.92762	0.40267	2.48340	1.07803	2.67718	4
57	0.37380	0.92751	0.40301	2.48132	1.07816	2.67525	3
58	0.37407	0.92740	0.40335	2.47924	1.07828	2.67332	2
59	0.37434	0.92729	0.40369	2.47716	1.07841	2.67139	1
60	0.37461	0.92718	0.40403	2.47509	1.07853	2.66947	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

22 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.37461	0.92718	0.40403	2.47509	1.07853	2.66947	60
1	0.37488	0.92707	0.40436	2.47302	1.07866	2.66755	59
2	0.37515	0.92697	0.40470	2.47095	1.07879	2.66563	58
3	0.37542	0.92686	0.40504	2.46888	1.07892	2.66371	57
4	0.37569	0.92675	0.40538	2.46682	1.07904	2.66180	56
5	0.37595	0.92664	0.40572	2.46476	1.07917	2.65989	55
6	0.37622	0.92653	0.40606	2.46270	1.07930	2.65799	54
7	0.37649	0.92642	0.40640	2.46065	1.07943	2.65609	53
8	0.37676	0.92631	0.40674	2.45860	1.07955	2.65419	52
9	0.37703	0.92620	0.40707	2.45655	1.07968	2.65229	51
10	0.37730	0.92609	0.40741	2.45451	1.07981	2.65040	50
11	0.37757	0.92598	0.40775	2.45246	1.07994	2.64851	49
12	0.37784	0.92587	0.40809	2.45043	1.08006	2.64662	48
13	0.37811	0.92576	0.40843	2.44839	1.08019	2.64473	47
14	0.37838	0.92565	0.40877	2.44636	1.08032	2.64285	46
15	0.37865	0.92554	0.40911	2.44433	1.08045	2.64097	45
16	0.37892	0.92543	0.40945	2.44230	1.08058	2.63909	44
17	0.37919	0.92532	0.40979	2 44027	1.08071	2.63722	43
18	0.37946	0.92521	0.41013	2.43825	1.08084	2.63535	42
19	0.37973	0.92510	0.41047	2.43623	1.08097	2.63348	41
20	0.37999	0.92499	0.41081	2.43422	1.08109	2.63162	40
21	0.38026	0.92488	0.41115	2.43220	1.08122	2.62976	39
22	0.38053	0.92477	0.41149	2.43019	1.08135	2.62790	38
23	0.38080	0.92466	0.41183	2.42819	1.08148	2.62604	37
24	0.38107	0.92455	0.41217	2.42618	1.08161	2.62419	36
25	0.38134	0.92444	0.41251	2.42418	1.08174	2.62234	35
26	0.38161	0.92432	0.41285	2.42218	1.08187	2.62049	34
27	0.38188	0.92421	0.41319	2.42019	1.08200	2.61864	33
28	0.38215	0.92410	0.41353	2.41819	1.08213	2.61680	32
29	0.38241	0.92399	0.41387	2.41620	1.08226	2.61496	31
30	0.38268	0.92388	0.41421	2.41421	1.08239	2.61313	30
31	0.38295	0.92377	0.41455	2.41223	1.08252	2.61129	29
32	0.38322	0.92366	0.41490	2.41025	1.08265	2.60946	28
33	0.38349	0.92355	0.41524	2.40827	1.08278	2.60763	27
34	0.38376	0.92343	0.41558	2.40629	1.08291	2.60581	26
35	0.38403	0.92332	0.41592	2.40432	1.08305	2.60399	25
36	0.38430	0.92321	0.41626	2.40235	1.08318	2.60217	24
37	0.38456	0.92310	0.41660	2.40038	1.08331	2.60035	23
38	0.38483	0.92299	0.41694	2.39841	1.08344	2.59853	22
39	0.38510	0.92287	0.41728	2.39645	1.08357	2.59672	21
40	0.38537	0.92276	0.41763	2.39449	1.08370	2.59491	20
41	0.38564	0.92265	0.41797	2.39253	1.08383	2.59311	19
42	0.38591	0.92254	0.41831	2.39058	1.08397	2.59130	18
43	0.38617	0.92243	0.41865	2.38863	1.08410	2.58950	17
44	0.38644	0.92231	0.41899	2.38668	1.08423	2.58771	16
45	0.38671	0.92220	0.41933	2.38473	1.08436	2.58591	15
46	0.38698	0.92209	0.41968	2.38279	1.08449	2.58412	14
47	0.38725	0.92198	0.42002	2.38084	1.08463	2.58233	13
48	0.38752	0.92186	0.42036	2.37891	1.08476	2.58054	12
49	0.38778	0.92175	0.42070	2.37697	1.08489	2.57876	11
50	0.38805	0.92164	0.42105	2.37504	1.08503	2.57698	10
51	0.38832	0.92152	0.42139	2.37311	1.08516	2.57520	9
52	0.38859	0.92141	0.42173	2.37118	1.08529	2.57342	8
53	0.38886	0.92130	0 42207	2.36925	1 08542	2.57165	7
54	0.38912	0.92119	0.42242	2.36733	1.08556	2.56988	6
55	0.38939	0.92107	0.42276	2.36541	1.08569	2.56811	5
56	0.38966	0.92096	0.42310	2.36349	1.08582	2.56634	4
57	0.38993	0.92085	0.42345	2.36158	1.08596	2.56458	3
58	0.39020	0.92073	0.42379	2.35967	1.08609	2.56282	2
59	0.39046	0.92062	0.42413	2.35776	1.08623	2.56106	1
60	0.39073	0.92050	0.42447	2.35585	1.08636	2.55930	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

23 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.39073	0.92050	0.42447	2.35585	1.08636	2.55930	60
1	0.39100	0.92039	0.42482	2.35395	1.08649	2.55755	59
2	0.39127	0.92028	0.42516	2.35205	1.08663	2.55580	58
3	0.39153	0.92016	0.42551	2.35015	1.08676	2.55405	57
4	0.39180	0.92005	0.42585	2.34825	1.08690	2.55231	56
5	0.39207	0.91994	0.42619	2.34636	1.08703	2.55057	55
6	0.39234	0.91982	0.42654	2.34447	1.08717	2.54883	54
7	0.39260	0.91971	0.42688	2.34258	1.08730	2.54709	53
8	0.39287	0.91959	0.42722	2.34069	1.08744	2.54536	52
9	0.39314	0.91948	0.42757	2.33881	1 08757	2.54363	51
10	0.39341	0.91936	0.42791	2.33693	1.08771	2.54190	50
11	0.39367	0.91925	0.42826	2.33505	1.08784	2.54017	49
12	0.39394	0.91914	0.42860	2.33317	1.08798	2.53845	48
13	0.39421	0.91902	0.42894	2 33130	1.08811	2.53672	47
14	0.39448	0.91891	0.42929	2.32943	1.08825	2.53500	46
15	0.39474	0.91879	0.42963	2.32756	1.08839	2.53329	45
16	0.39501	0.91868	0.42998	2.32570	1.08852	2.53157	44
17	0 39528	0.91856	0.43032	2.32383	1.08866	2.52986	43
18	0.39555	0.91845	0.43067	2.32197	1.08880	2.52815	42
19	0.39581	0.91833	0.43101	2.32012	1.08893	2.52645	41
20	0.39608	0.91822	0.43136	2.31826	1.08907	2.52474	40
21	0.39635	0.91810	0.43170	2.31641	1.08920	2.52304	39
22	0.39661	0.91799	0.43205	2.31456	1.08934	2.52134	38
23	0.39688	0.91787	0.43239	2.31271	1 08948	2.51965	37
24	0.39715	0.91775	0.43274	2.31086	1.08962	2.51795	36
25	0.39741	0.91764	0.43308	2.30902	1.08975	2 51626	35
26	0.39768	0.91752	0.43343	2.30718	1.08989	2.51457	34
27	0.39795	0.91741	0.43378	2.30534	1.09003	2.51289	33
28	0.39822	0.91729	0.43412	2.30351	1.09017	2.51120	32
29	0.39848	0.91718	0.43447	2.30167	1.09030	2 50952	31
30	0.39875	0.91706	0.43481	2.29984	1.09044	2.50784	30
31	0.39902	0.91694	0 43516	2.29801	1.09058	2.50617	29
32	0.39928	0.91683	0.43550	2.29619	1.09072	2.50449	28
33	0.39955	0.91671	0.43585	2.29437	1.09086	2.50282	27
34	0.39982	0.91660	0.43620	2.29254	1.09099	2.50115	26
35	0.40008	0.91648	0.43654	2.29073	1.09113	2.49948	25
36	0.40035	0.91636	0.43689	2.28891	1.09127	2.49782	24
37	0.40062	0.91625	0 43724	2.28710	1.09141	2.49616	23
38	0.40088	0.91613	0.43758	2.28528	1.09155	2.49450	22
39	0.40115	0.91601	0.43793	2.28348	1.09169	2.49284	21
40	0.40141	0.91590	0.43828	2.28167	1 09183	2.49119	20
41	0.40168	0.91578	0.43862	2.27987	1.09197	2 48954	19
42	0.40195	0.91566	0.43897	2.27806	1.09211	2.48789	18
43	0.40221	0.91555	0.43932	2.27626	1.09224	2 48624	17
44	0.40248	0.91543	0.43966	2.27447	1.09238	2.48459	16
45	0.40275	0.91531	0.44001	2.27267	1.09252	2.48295	15
46	0 40301	0.91519	0.44036	2.27088	1.09266	2.48131	14
47	0.40328	0.91508	0.44071	2.26909	1.09280	2.47967	13
48	0.40355	0.91496	0 44105	2.26730	1.09294	2.47804	12
49	0.40381	0.91484	0.44140	2.26552	1.09308	2.47640	11
50	0.40408	0.91472	0.44175	2.26374	1.09323	2.47477	10
51	0.40434	0.91461	0.44210	2.26196	1.09337	2.47314	9
52	0.40461	0.91449	0.44244	2.26018	1.09351	2.47152	8
53	0.40488	0.91437	0.44279	2.25840	1.09365	2.46989	7
54	0.40514	0.91425	0.44314	2.25663	1.09379	2.46827	6
55	0.40541	0.91414	0.44349	2.25486	1.09393	2.46665	5
56	0.40567	0.91402	0.44384	2.25309	1.09407	2.46504	4
57	0.40594	0.91390	0.44418	2.25132	1.09421	2.46342	3
58	0.40621	0.91378	0.44453	2.24956	1.09435	2.46181	2
59	0.40647	0.91366	0.44488	2.24780	1.09449	2.46020	1
60	0.40674	0.91355	0.44523	2.24604	1.09464	2.45859	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

66 °

24°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.40674	0 91355	0.44523	2.24604	1.09464	2.45859	60
1	0.40700	0.91343	0.44558	2.24428	1.09478	2.45699	59
2	0.40727	0.91331	0.44593	2.24252	1.09492	2.45539	58
3	0.40753	0.91319	0.44627	2.24077	1.09506	2.45378	57
4	0.40780	0.91307	0.44662	2.23902	1.09520	2.45219	59
5	0.40806	0.91295	0.44697	2.23727	1.09535	2.45059	55
6	0.40833	0.91283	0.44732	2.23553	1.09549	2.44900	54
7	0.40860	0.91272	0.44767	2.23378	1.09563	2.44741	53
8	0.40886	0.91260	0.44802	2.23204	1.09577	2.44582	52
9	0.40913	0.91248	0.44837	2.23030	1.09592	2.44423	51
10	0.40939	0.91236	0.44872	2.22857	1.09606	2.44264	50
11	0.40966	0.91224	0.44907	2.22683	1.09620	2.44106	49
12	0.40992	0.91212	0.44942	2.22510	1.09635	2.43948	48
13	0.41019	0.91200	0.44977	2.22337	1.09649	2.43790	47
14	0.41045	0.91188	0.45012	2.22164	1.09663	2.43633	46
15	0.41072	0.91176	0.45047	2.21992	1.09678	2.43476	45
16	0.41098	0.91164	0.45082	2.21819	1.09692	2.43318	44
17	0.41125	0.91152	0.45117	2.21647	1.09707	2.43162	43
18	0.41151	0.91140	0.45152	2.21475	1.09721	2.43005	42
19	0.41178	0.91128	0.45187	2.21304	1.09735	2.42848	41
20	0.41204	0.91116	0.45222	2.21132	1.09750	2.42692	40
21	0 41231	0.91104	0.45257	2.20961	1.09764	2.42536	39
22	0.41257	0.91092	0.45292	2.20790	1.09779	2.42380	38
23	0.41284	6.91080	0.45327	2.20619	1.09793	2.42225	37
24	0.41310	0.91068	0.45362	2.20449	1.09808	2.42070	36
25	0.41337	0.91056	0.45397	2 20278	1.09822	2.41914	35
26	0.41363	0.91044	0.45432	2.20108	1.09837	2.41760	34
27	0.41390	0.91032	0.45467	2 19938	1.09851	2.41605	33
28	0.41416	0.91020	0.45502	2.19769	1.09866	2.41450	32
29	0.41443	0 91008	0 45538	2.19599	1.09880	2.41296	31
30	0.41469	0.90996	0.45573	2.19430	1.09895	2.41142	30
31	0.41496	0.90984	0.45608	2.19261	1.09909	2.40988	29
32	0.41522	0.90972	0.45643	2.19092	1.09924	2.40835	28
33	0.41549	0.90960	0.45678	2.18923	1.09939	2.40681	27
34	0.41575	0.90948	0.45713	2.18755	1.09953	2.40528	26
35	0.41602	0.90936	0.45748	2.18587	1.09968	2.40475	25
36	0.41628	0.90924	0.45784	2.18419	1.09982	2.40222	24
37	0.41655	0.90911	0.45819	2.18251	1.09997	2.40070	23
38	0.41681	0.90899	0.45854	2.18084	1.10012	2.39918	22
39	0.41707	0.90887	0.45889	2.17916	1.10026	2.39766	21
40	0.41734	0.90875	0.45924	2.17749	1.10041	2.39614	20
41	0.41760	0.90863	0.45960	2.17582	1.10056	2.39462	19
42	0.41787	0 90851	0.45995	2.17416	1.10071	2.39311	18
43	0.41813	0.90839	0.46030	2.17249	1.10085	2.39159	17
44	0.41840	0.90826	0.46065	2.17083	1.10100	2.39008	16
45	0.41866	0.90814	0.46101	2.16917	1.10115	2.38857	15
46	0.41892	0.90802	0.46136	2.16751	1.10130	2.38707	14
47	0.41919	0.90790	0.46171	2.16585	1.10144	2.38556	13
48	0.41945	0.90778	0.46206	2.16420	1 10159	2.38406	12
49	0.41972	0.90766	0.46242	2.16255	1.10174	2.38256	11
50	0.41998	0.90753	0.46277	2.16090	1.10189	2.38107	10
51	0.42024	0.90741	0.46312	2.15925	1.10204	2.37957	9
52	0.42051	0 90729	0.46348	2.15760	1.10218	2.37808	8
53	0.42077	0.90717	0.46383	2.15596	1.10233	2.37658	7
54	0.42104	0.90704	0.46418	2.15432	1.10248	2.37509	6
55	0.42130	0.90692	0.46454	2.15268	1.10263	2.37361	5
56	0.42156	0.90680	0.46489	2.15104	1.10278	2.37212	4
57	0.42183	0.90668	0.46525	2.14940	1.10293	2.37064	3
58	0.42209	0.90655	0.46560	2.14777	1.10308	2.36916	2
59	0.42235	0.90643	0.46595	2.14614	1.10323	2.36768	1
60	0.42262	0.90631	0.46631	2.14451	1.10338	2.36620	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

25 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.42262	0.90631	0.46631	2.14451	1.10338	2.36620	60
1	0.42288	0.90618	0.46666	2.14288	1.10353	2.36473	59
2	0 42315	0.90606	0.46702	2.14125	1.10368	2.36325	58
3	0.42341	0.90594	0.46737	2.13963	1.10383	2.36178	57
4	0.42367	0.90582	0.46773	2.13801	1.10398	2.36031	56
5	0.42394	0.90569	0.46808	2.13639	1.10413	2.35885	55
6	0.42420	0.90557	0.46843	2.13477	1.10428	2.35738	54
7	0.42446	0.90545	0.46879	2.13316	1.10443	2.35592	53
8	0.42473	0.90532	0.46914	2.13154	1.10458	2.35446	52
9	0.42499	0.90520	0.46950	2.12993	1.10473	2.35300	51
10	0.42525	0.90507	0.46985	2.12832	1.10488	2.35154	50
11	0.42552	0.90495	0.47021	2.12671	1.10503	2.35009	49
12	0.42578	0.90483	0.47056	2.12511	1.10518	2.34863	48
13	0.42604	0.90470	0.47092	2.12350	1.10533	2.34718	47
14	0.42631	0.90458	0.47128	2.12190	1.10549	2.34573	46
15	0 42657	0.90446	0.47163	2.12030	1.10564	2.34429	45
16	0.42683	0.90433	0.47199	2.11871	1.10579	2.34284	44
17	0.42709	0.90421	0.47234	2.11711	1.10594	2.34140	43
18	0.42736	0.90408	0.47270	2.11552	1.10609	2.33996	42
19	0.42762	0.90396	0.47305	2.11392	1.10625	2.33852	41
20	0.42788	0.90383	0.47341	2.11233	1.10640	2.33708	40
21	0.42815	0.90371	0.47377	2.11075	1.10655	2.33565	39
22	0 42841	0.90358	0.47412	2.10916	1.10670	2.33422	38
23	0.42867	0.90346	0.47448	2.10758	1.10686	2.33278	37
24	0.42894	0.90334	0.47483	2.10600	1.10701	2.33135	36
25	0.42920	0.90321	0.47519	2.10442	1.10716	2.32993	35
26	0.42946	0 90308	0.47555	2.10284	1.10731	2.32850	34
27	0.42972	0.90296	0.47590	2.10126	1.10747	2.32708	33
28	0.42999	0.90284	0.47626	2.09969	1.10762	2.32566	32
29	0 43025	0.90271	0.47662	2.09811	1.10777	2.32424	31
30	0.43051	0.90259	0.47698	2.09654	1.10793	2.32282	30
31	0.43077	0.90246	0 47733	2.09498	1.10808	2.32140	29
32	0.43104	0.90233	0 47769	2.09341	1.10824	2.31999	28
33	0.43130	0.90221	0.47805	2.09184	1.10839	2.31858	27
34	0.43156	0.90208	0.47840	2.09028	1.10854	2.31717	26
35	0.43182	0.90196	0 47876	2.08872	1.10870	2.31576	25
36	0.43209	0 90183	0.47912	2.08716	1.10885	2.31436	24
37	0.43235	0.90171	0 47948	2.08560	1.10901	2.31295	23
38	0.43261	0.90158	0.47984	2.08405	1.10916	2.31155	22
39	0.43287	0.90146	0.48019	2.08250	1.10932	2 31015	21
40	0.43313	0.90133	0.48055	2.08094	1.10947	2.30875	20
41	0.43340	0.90120	0.48091	2.07939	1.10963	2.30735	19
42	0.43366	0.90108	0.48127	2.07785	1.10978	2.30596	18
43	0.43392	0.90095	0.48163	2.07630	1.10994	2.30457	17
44	0.43418	0.90082	0.48198	2.07476	1.11009	2.30318	16
45	0 43445	0.90070	0.48234	2.07321	1.11025	2.30179	15
46	0.43471	0.90057	0.48270	2.07167	1.11041	2.30040	14
47	0.43497	0.90045	0.48306	2.07014	1.11056	2.29901	13
48	0.43523	0.90032	0.48342	2.06860	1.11072	2.29763	12
49	0.43549	0.90019	0.48378	2.06706	1.11087	2.29625	11
50	0.43575	0.90007	0.48414	2.06553	1.11103	2.29487	10
51	0.43602	0.89994	0.48450	2.06400	1.11119	2.29349	9
52	0.43628	0.89981	0.48486	2.06247	1.11134	2.29211	8
53	0.43654	0 89968	0.48521	2.06094	1.11150	2.29074	7
54	0.43680	0.89956	0.48557	2 05942	1.11166	2.28937	6
55	0.43706	0.89943	0.48593	2.05790	1.11181	2.28800	5
56	0.43733	0.89930	0.48629	2.05637	1.11197	2.28663	4
57	0.43759	0.89918	0.48665	2.05485	1.11213	2.28526	3
58	0.43785	0. 89905	0.48701	2.05333	1.11229	2.28390	2
59	0.43811	0.89892	0.48737	2.05182	1.11244	2.28253	1
60	0.43837	0.89879	0.48773	2.05030	1.11260	2.28117	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

64 °

26°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.43837	0.89879	0.48773	2.05030	1.11260	2.28117	60
1	0.43863	0.89867	0.48809	2.04879	1.11276	2.27981	59
2	0.43889	0.89854	0.48845	2.04728	1.11292	2.27845	58
3	0.43916	0.89841	0.48881	2.04577	1.11308	2.27710	57
4	0.43942	0.89828	0.48917	2.04426	1.11323	2.27574	56
5	0.43968	0.89816	0.48953	2.04276	1.11339	2.27439	55
6	0.43994	0.89803	0.48989	2.04125	1.11355	2.27304	54
7	0.44020	0.89790	0.49026	2.03975	1.11371	2.27169	53
8	0.44046	0.89777	0.49062	2.03825	1.11387	2.27035	52
9	0.44072	0.89764	0.49098	2.03675	1.11403	2.26900	51
10	0.44098	0.89752	0.49134	2.03526	1.11419	2.26766	50
11	0.44124	0.89739	0.49170	2.03376	1.11435	2.26632	49
12	0.44151	0.89726	0.49206	2.03227	1.11451	2.26498	48
13	0.44177	0.89713	0.49242	2.03078	1.11467	2.26364	47
14	0.44203	0.89700	0.49278	2.02929	1.11483	2.26230	46
15	0.44229	0.89687	0.49315	2.02780	1.11499	2.26097	45
16	0.44255	0.89674	0.49351	2.02631	1.11515	2.25963	44
17	0.44281	0.89662	0.49387	2.02483	1.11531	2.25830	43
18	0.44307	0.89649	0.49423	2.02335	1.11547	2.25697	42
19	0.44333	0.89636	0.49459	2.02187	1.11563	2.25565	41
20	0.44359	0.89623	0.49495	2.02039	1.11579	2.25432	40
21	0.44385	0.89610	0.49532	2.01891	1.11595	2.25300	39
22	0.44411	0.89597	0.49568	2.01743	1.11611	2.25167	38
23	0.44437	0.89584	0.49604	2.01596	1.11627	2.25035	37
24	0.44464	0.89571	0.49640	2.01449	1.11643	2.24903	36
25	0.44490	0.89558	0.49677	2.01302	1.11659	2.24772	35
26	0.44516	0.89545	0.49713	2.01155	1.11675	2.24640	34
27	0.44542	0.89532	0.49749	2.01008	1.11691	2.24509	33
28	0.44568	0.89519	0.49786	2.00862	1.11708	2.24378	32
29	0.44594	0.89506	0.49822	2.00715	1.11724	2.24247	31
30	0.44620	0.89493	0.49858	2.00569	1.11740	2.24116	30
31	0.44646	0.89480	0.49894	2.00423	1.11756	2.23985	29
32	0.44672	0.89467	0.49931	2.00277	1.11772	2.23855	28
33	0.44698	0.89454	0.49967	2.00131	1.11789	2.23724	27
34	0.44724	0.89441	0.50004	1.99986	1.11805	2.23594	26
35	0.44750	0.89428	0.50040	1.99841	1.11821	2.23464	25
36	0.44776	0.89415	0.50076	1.99695	1.11838	2.23334	24
37	0.44802	0.89402	0.50113	1.99550	1.11854	2.23205	23
38	0.44828	0.89389	0.50149	1.99406	1.11870	2.23075	22
39	0.44854	0.89376	0.50185	1.99261	1.11886	2.22946	21
40	0.44880	0.89363	0.50222	1.99116	1.11903	2.22817	20
41	0.44906	0.89350	0.50258	1.98972	1.11919	2.22688	19
42	0.44932	0.89337	0.50295	1.98828	1.11936	2.22559	18
43	0.44958	0.89324	0.50331	1.98684	1.11952	2.22430	17
44	0.44984	0.89311	0.50368	1.98540	1.11968	2.22302	16
45	0.45010	0.89298	0.50404	1.98396	1.11985	2.22174	15
46	0.45036	0.89285	0.50441	1.98253	1.12001	2.22045	14
47	0.45062	0.89272	0.50477	1.98110	1.12018	2.21918	13
48	0.45088	0.89259	0.50514	1.97966	1.12034	2.21790	12
49	0.45114	0.89245	0.50550	1.97823	1.12051	2.21662	11
50	0.45140	0.89232	0.50587	1.97681	1.12067	2.21535	10
51	0.45166	0.89219	0.50623	1.97538	1.12083	2.21407	9
52	0.45192	0.89206	0.50660	1.97395	1.12100	2.21280	8
53	0.45218	0.89193	0.50696	1.97253	1.12117	2.21153	7
54	0.45243	0.89180	0.50733	1.97111	1.12133	2.21026	6
55	0.45269	0.89167	0.50769	1.96969	1.12150	2.20900	5
56	0.45295	0.89153	0.50806	1.96827	1.12166	2.20773	4
57	0.45321	0.89140	0.50843	1.96685	1.12183	2.20647	3
58	0.45347	0.89127	0.50879	1.96544	1.12199	2.20521	2
59	0.45373	0.89114	0.50916	1.96402	1.12216	2.20395	1
60	0.45399	0.89101	0.50953	1.96261	1.12233	2.20269	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

27 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.45399	0.89101	0.50953	1.96261	1.12233	2.20269	60
1	0.45425	0.89087	0.50989	1.96120	1.12249	2.20143	59
2	0.45451	0.89074	0.51026	1.95979	1.12266	2.20018	58
3	0.45477	0.89061	0.51063	1.95838	1.12283	2.19892	57
4	0.45503	0.89048	0.51099	1.95698	1.12299	2.19767	56
5	0.45529	0.89035	0.51136	1.95557	1.12316	2.19642	55
6	0.45554	0.89021	0.51173	1.95417	1.12333	2.19517	54
7	0.45580	0.89008	0.51209	1.95277	1.12349	2.19393	53
8	0.45606	0.88995	0.51246	1.95137	1.12366	2.19268	52
9	0.45632	0.88981	0.51283	1.94997	1.12383	2.19144	51
10	0.45658	0.88968	0.51319	1.94858	1.12400	2.19019	50
11	0.45684	0.88955	0.51356	1.94718	1.12416	2.18895	49
12	0.45710	0.88942	0.51393	1.94579	1.12433	2.18772	48
13	0.45736	0.88928	0.51429	1.94440	1.12450	2.18648	47
14	0.45762	0.88915	0.51467	1.94301	1.12467	2.18524	46
15	0.45787	0.88902	0.51503	1.94162	1.12484	2.18401	45
16	0.45813	0.88888	0.51540	1.94023	1.12501	2.18277	44
17	0.45839	0.88875	0.51577	1.93885	1.12518	2.18154	43
18	0.45865	0.88862	0.51614	1.93746	1.12534	2.18031	42
19	0.45891	0.88848	0.51651	1.93608	1.12551	2.17909	41
20	0.45917	0.88835	0.51688	1.93470	1.12568	2.17786	40
21	0.45942	0.88822	0.51724	1.93332	1.12585	2.17663	39
22	0.45968	0.88808	0.51761	1.93195	1.12602	2.17541	38
23	0.45994	0.88795	0.51798	1.93057	1.12619	2.17419	37
24	0.46020	0.88782	0.51835	1.92920	1.12636	2.17297	36
25	0.46046	0.88768	0.51872	1.92782	1.12653	2.17175	35
26	0.46072	0.88755	0.51909	1.92645	1.12670	2.17053	34
27	0.46097	0.88741	0.51946	1.92508	1.12687	2.16932	33
28	0.46123	0.88728	0.51983	1.92371	1.12704	2.16810	32
29	0.46149	0.88715	0.52020	1.92235	1.12721	2.16689	31
30	0.46175	0.88701	0.52057	1.92098	1.12738	2.16568	30
31	0.46201	0.88688	0.52094	1.91962	1.12755	2.16447	29
32	0.46226	0.88674	0.52131	1.91826	1.12772	2.16326	28
33	0.46252	0.88661	0.52168	1.91690	1.12789	2.16206	27
34	0.46278	0.88647	0.52205	1.91554	1.12807	2.16085	26
35	0.46304	0.88634	0.52242	1.91418	1.12824	2.15965	25
36	0.46330	0.88620	0.52279	1.91282	1.12841	2.15845	24
37	0.46355	0.88607	0.52316	1.91147	1.12858	2.15725	23
38	0.46381	0.88593	0.52353	1.91012	1.12875	2.15605	22
39	0.46407	0.88580	0.52390	1.90876	1.12892	2.15485	21
40	0.46433	0.88566	0.52427	1.90741	1.12910	2.15366	20
41	0.46458	0.88553	0.52464	1.90607	1.12927	2.15246	19
42	0.46484	0.88539	0.52501	1.90472	1.12944	2.15127	18
43	0.46510	0.88526	0.52538	1.90337	1.12961	2.15008	17
44	0.46536	0.88512	0.52575	1.90203	1.12979	2.14889	16
45	0.46561	0.88499	0.52613	1.90069	1.12996	2.14770	15
46	0.46587	0.88485	0.52650	1.89935	1.13013	2.14651	14
47	0.46613	0.88472	0.52687	1.89801	1.13031	2.14533	13
48	0.46639	0.88458	0.52724	1.89667	1.13048	2.14414	12
49	0.46664	0.88445	0.52761	1.89533	1.13065	2.14296	11
50	0.46690	0.88431	0.52798	1.89400	1.13083	2.14178	10
51	0.46716	0.88417	0.52836	1.89266	1.13100	2.14060	9
52	0.46742	0.88404	0.52873	1.89133	1.13117	2.13942	8
53	0.46767	0.88390	0.52910	1.89000	1.13135	2.13825	7
54	0.46793	0.88377	0.52947	1.88867	1.13152	2.13707	6
55	0.46819	0.88363	0.52985	1.88734	1.13170	2.13590	5
56	0.46844	0.88349	0.53022	1.88602	1.13187	2.13473	4
57	0.46870	0.88336	0.53059	1.88469	1.13205	2.13356	3
58	0.46896	0.88322	0.53096	1.88337	1.13222	2.13239	2
59	0.46921	0.88308	0.53134	1.88205	1.13239	2.13122	1
60	0.46947	0.88295	0.53171	1.88073	1.13257	2.13005	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

62 °

28 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.46947	0.88295	0.53171	1.88073	1.13257	2.13005	60
1	0.46973	0.88281	0.53208	1.87941	1.13275	2.12889	59
2	0.46999	0.88267	0.53246	1.87809	1.13292	2.12773	58
3	0.47024	0.88254	0.53283	1.87677	1.13310	2.12657	57
4	0.47050	0.88240	0.53320	1.87546	1.13327	2.12540	56
5	0.47076	0.88226	0.53358	1.87415	1.13345	2.12425	55
6	0.47101	0.88213	0.53395	1.87283	1.13362	2.12309	54
7	0.47127	0.88199	0.53432	1.87152	1.13380	2.12193	53
8	0.47153	0.88185	0.53470	1.87021	1.13398	2.12078	52
9	0.47178	0.88172	0.53507	1.86891	1.13415	2.11963	51
10	0.47204	0.88158	0.53545	1.86760	1.13433	2.11847	50
11	0.47229	0.88144	0.53582	1.86630	1.13451	2.11732	49
12	0.47255	0.88130	0.53620	1.86499	1.13468	2.11617	48
13	0.47281	0.88117	0.53657	1.86369	1.13486	2.11503	47
14	0.47306	0.88103	0.53694	1.86239	1.13504	2.11388	46
15	0.47332	0.88089	0.53732	1.86109	1.13521	2.11274	45
16	0.47358	0.88075	0.53769	1.85979	1.13539	2.11159	44
17	0.47383	0.88062	0.53807	1.85850	1.13557	2.11045	43
18	0.47409	0.88048	0.53844	1.85720	1.13575	2.10931	42
19	0.47434	0.88034	0.53882	1.85591	1.13593	2.10817	41
20	0.47460	0.88020	0.53920	1.85462	1.13610	2.10704	40
21	0.47486	0.88006	0.53957	1.85333	1.13628	2.10590	39
22	0.47511	0 87993	0.53995	1.85204	1.13646	2.10477	38
23	0.47537	0.87979	0.54032	1.85075	1.13664	2.10363	37
24	0.47562	0.87965	0.54070	1.84946	1.13682	2.10250	36
25	0.47588	0.87951	0.54107	1.84818	1.13700	2.10137	35
26	0.47614	0 87937	0.54145	1.84689	1.13718	2.10024	34
27	0.47639	0.87923	0.54183	1.84561	1.13735	2.09911	33
28	0.47665	0.87909	0.54220	1.84433	1.13753	2.09799	32
29	0.47690	0.87896	0.54258	1.84305	1.13771	2.09686	31
30	0.47716	0.87882	0.54296	1.84177	1.13789	2.09574	30
31	0.47741	0.87868	0.54333	1.84049	1.13807	2.09462	29
32	0.47767	0.87854	0.54371	1.83922	1.13825	2.09350	28
33	0.47793	0.87840	0.54409	1.83794	1.13843	2.09238	27
34	0.47818	0.87826	0.54446	1.83667	1.13861	2.09126	26
35	0.47844	0.87812	0.54484	1.83540	1.13879	2.09014	25
36	0.47869	0.87798	0.54522	1.83413	1.13897	2.08903	24
37	0.47895	0.87784	0.54560	1.83286	1.13915	2 08791	23
38	0.47920	0.87770	0.54597	1.83159	1.13934	2.08680	22
39	0.47946	0.87756	0.54635	1.83033	1.13952	2.08569	21
40	0.47971	0.87743	0.54673	1.82906	1.13970	2.08458	20
41	0.47997	0.87729	0.54711	1.82780	1.13988	2.08347	19
42	0.48022	0.87715	0.54748	1.82654	1.14006	2.08236	18
43	0.48048	0.87701	0.54786	1.82528	1.14024	2.08126	17
44	0.48073	0.87687	0.54824	1.82402	1.14042	2.08015	16
45	0.48099	0.87673	0.54862	1.82276	1 14061	2.07905	15
46	0.48124	0.87659	0.54900	1.82150	1.14079	2.07795	14
47	0.48150	0.87645	0.54938	1.82025	1.14097	2.07685	13
48	0.48175	0.87631	0.54975	1.81899	1.14115	2.07575	12
49	0.48201	0.87617	0.55013	1.81774	1.14134	2.07465	11
50	0.48226	0.87603	0.55051	1.81649	1.14152	2.07356	10
51	0.48252	0.87589	0.55089	1.81524	1.14170	2.07246	9
52	0.48277	0.87575	0.55127	1.81399	1.14188	2.07137	8
53	0.48303	0.87561	0.55165	1.81274	1.14207	2.07027	7
54	0.48328	0.87546	0.55203	1.81150	1.14225	2.06918	6
55	0.48354	0.87532	0.55241	1.81025	1.14243	2.06809	5
56	0.48379	0.87518	0.55279	1.80901	1.14262	2.06701	4
57	0.48405	0.87504	0.55317	1.80777	1.14280	2.06592	3
58	0.48430	0 87490	0.55355	1.80653	1.14299	2.06483	2
59	0.48456	0.87476	0.55393	1.80529	1.14317	2.06375	1
60	0.48481	0.87462	0.55431	1.80405	1.14335	2.06267	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

61 °

29°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.48481	0.87462	0.55431	1 80405	1.14335	2.06267	60
1	0.48506	0.87448	0.55469	1.80281	1.14354	2.06158	59
2	0.48532	0 87434	0.55507	1.80158	1.14372	2.06050	58
3	0.48557	0.87420	0.55545	1.80034	1.14391	2.05942	57
4	0.48583	0.87406	0.55583	1.79911	1.14409	2.05835	56
5	0.48608	0.87391	0.55621	1.79788	1.14428	2.05727	55
6	0.48634	0.87377	0.55659	1.79665	1.14446	2.05619	54
7	0.48659	0.87363	0.55697	1.79542	1.14465	2.05512	53
8	0.48684	0.87349	0.55736	1.79419	1.14483	2.05405	52
9	0.48710	0.87335	0.55774	1.79296	1.14502	2.05298	51
10	0.48735	0.87321	0.55812	1.79174	1.14521	2.05191	50
11	0.48761	0.87306	0.55850	1.79051	1.14539	2.05084	49
12	0.48786	0.87292	0.55888	1.78929	1.14558	2.04977	48
13	0.48811	0.87278	0.55926	1.78807	1.14576	2.04870	47
14	0.48837	0.87264	0.55964	1.78685	1.14595	2.04764	46
15	0.48862	0.87250	0.56003	1.78563	1.14614	2.04657	45
16	0.48888	0.87235	0.56041	1.78441	1.14632	2.04551	44
17	0.48913	0.87221	0.56079	1.78319	1.14651	2.04445	43
18	0.48938	0.87207	0.56117	1.78198	1.14670	2.04339	42
19	0.48964	0.87193	0.56156	1.78077	1.14689	2.04233	41
20	0.48989	0.87178	0.56194	1.77955	1.14707	2.04128	40
21	0.49014	0.87164	0.56232	1.77834	1.14726	2.04022	39
22	0.49040	0.87150	0.56270	1.77713	1.14745	2.03916	38
23	0.49065	0.87136	0.56309	1.77592	1.14764	2.03811	37
24	0.49090	0.87121	0.56347	1.77471	1.14782	2.03706	36
25	0.49116	0 87107	0.56385	1.77351	1.14801	2.03601	35
26	0.49141	0.87093	0.56424	1.77230	1.14820	2.03496	34
27	0.49166	0.87079	0.56462	1.77110	1.14839	2.03391	33
28	0.49192	0.87064	0.56501	1.76990	1.14858	2.03286	32
29	0.49217	0.87050	0.56539	1.76869	1.14877	2.03182	31
30	0.49242	0.87036	0.56577	1.76749	1.14896	2.03077	30
31	0.49268	0.87021	0.56616	1.76629	1.14914	2.02973	29
32	0.49293	0.87007	0.56654	1.76510	1.14933	2.02869	28
33	0.49318	0.86993	0.56693	1.76390	1.14952	2.02765	27
34	0.49344	0.86978	0.56731	1 76271	1.14971	2.02661	26
35	0.49369	0.86964	0.56769	1.76151	1.14990	2.02557	25
36	0.49394	0.86949	0.56808	1.76032	1.15009	2.02453	24
37	0.49419	0.86935	0.56846	1.75913	1.15028	2.02349	23
38	0.49445	0.86921	0.56885	1.75794	1.15047	2.02246	22
39	0.49470	0.86906	0.56923	1.75675	1.15066	2.02143	21
40	0.49495	0.86892	0.56962	1.75556	1.15085	2.02039	20
41	0.49521	0.86878	0.57000	1.75437	1.15105	2.01936	19
42	0.49546	0.86863	0.57039	1.75319	1.15124	2.01833	18
43	0.49571	0 86849	0.57078	1.75200	1.15143	2.01730	17
44	0.49596	0.86834	0.57116	1.75082	1.15162	2.01628	16
45	0.49622	0.86820	0.57155	1.74964	1.15181	2.01525	15
46	0.49647	0.86805	0.57193	1.74846	1.15200	2.01422	14
47	0.49672	0.86791	0.57232	1.74728	1.15219	2.01320	13
48	0.49697	0.86777	0.57271	1.74610	1.15239	2.01218	12
49	0.49723	0.86762	0.57309	1.74492	1.15258	2.01116	11
50	0.49748	0.86748	0.57348	1.74375	1.15277	2.01014	10
51	0.49773	0.86733	0.57386	1.74257	1.15296	2.00912	9
52	0.49798	0.86719	0.57425	1.74140	1.15315	2.00810	8
53	0.49824	0.86704	0.57464	1.74022	1.15335	2.00708	7
54	0.49849	0.86690	0.57503	1.73950	1.15354	2.00607	6
55	0.49874	0.86675	0.57541	1.73788	1.15373	2.00505	5
56	0.49899	0.86661	0.57580	1.73671	1.15393	2.00404	4
57	0.49924	0.86646	0.57619	1.73555	1.15412	2.00303	3
58	0.49950	0.86632	0.57657	1.73438	1.15431	2.00202	2
59	0.49975	0.86617	0.57696	1.73321	1.15451	2.00101	1
60	0.50000	0.86603	0.57735	1.73205	1.15470	2.00000	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

60°

30°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.50000	0.86603	0.57735	1.73205	1.15470	2.00000	60
1	0.50025	0.86588	0.57774	1.73089	1.15489	1.99899	59
2	0.50050	0.86573	0.57813	1.72973	1.15509	1.99799	58
3	0.50076	0.86559	0.57851	1.72857	1.15528	1.99698	57
4	0.50101	0.86544	0.57890	1.72741	1.15548	1.99598	56
5	0.50126	0.86530	0.57929	1.72625	1.15567	1.99498	55
6	0.50151	0.86515	0.57968	1.72509	1.15587	1.99398	54
7	0.50176	0.86501	0.58007	1.72393	1.15606	1.99298	53
8	0.50201	0.86486	0.58046	1.72278	1.15626	1.99198	52
9	0.50227	0.86471	0.58085	1.72163	1.15645	1.99098	51
10	0.50252	0.86457	0.58124	1.72047	1.15665	1.98998	50
11	0.50277	0.86442	0.58162	1.71932	1.15684	1.98899	49
12	0.50302	0.86427	0.58201	1.71817	1.15704	1.98799	48
13	0.50327	0.86413	0.58240	1.71702	1.15724	1.98700	47
14	0.50352	0.86398	0.58279	1.71588	1.15743	1.98601	46
15	0.50377	0.86384	0.58318	1.71473	1.15763	1.98502	45
16	0.50403	0.86369	0.58357	1.71358	1.15782	1.98403	44
17	0.50428	0.86354	0.58396	1.71244	1.15802	1.98304	43
18	0.50453	0.86340	0.58435	1.71129	1.15822	1.98205	42
19	0.50478	0.86325	0.58474	1.71015	1.15841	1.98107	41
20	0.50503	0.86310	0.58513	1.70901	1.15861	1.98008	40
21	0.50528	0.86295	0.58552	1.70787	1.15881	1.97910	39
22	0.50553	0.86281	0.58591	1.70673	1.15901	1.97811	38
23	0.50578	0.86266	0.58631	1.70560	1.15920	1.97713	37
24	0.50603	0.86251	0.58670	1.70446	1.15940	1.97615	36
25	0.50628	0.86237	0.58709	1.70332	1.15960	1.97517	35
26	0.50654	0.86222	0.58748	1.70219	1.15980	1.97420	34
27	0.50679	0.86207	0.58787	1.70106	1.16000	1.97322	33
28	0.50704	0.86192	0.58826	1.69992	1.16019	1.97224	32
29	0.50729	0.86178	0.58865	1.69879	1.16039	1.97127	31
30	0.50754	0.86163	0.58905	1.69766	1.16059	1.97029	30
31	0.50779	0.86148	0.58944	1.69653	1.16079	1.96932	29
32	0.50804	0.86133	0.58983	1.69541	1.16099	1.96835	28
33	0.50829	0.86119	0.59022	1.69428	1.16119	1.96738	27
34	0.50854	0.86104	0.59061	1.69316	1.16139	1.96641	26
35	0.50879	0.86089	0.59101	1.69203	1.16159	1.96544	25
36	0.50904	0.86074	0.59140	1.69091	1.16179	1.96448	24
37	0.50929	0.86059	0.59179	1.68979	1.16199	1.96351	23
38	0.50954	0.86045	0.59218	1.68866	1.16219	1.96255	22
39	0.50979	0.86030	0.59258	1.68754	1.16239	1.96158	21
40	0.51004	0.86015	0.59297	1.68643	1.16259	1.96062	20
41	0.51029	0.86000	0.59336	1.68531	1.16279	1.95966	19
42	0.51054	0.85985	0.59376	1.68419	1.16299	1.95870	18
43	0.51079	0.85970	0.59415	1.68308	1.16319	1.95774	17
44	0.51104	0.85956	0.59454	1.68196	1.16339	1.95678	16
45	0.51129	0.85941	0.59494	1.68085	1.16359	1.95583	15
46	0.51154	0.85926	0.59533	1.67974	1.16380	1.95487	14
47	0.51179	0.85911	0.59573	1.67863	1.16400	1.95392	13
48	0.51204	0.85896	0.59612	1.67752	1.16420	1.95296	12
49	0.51229	0.85881	0.59651	1.67641	1.16440	1.95201	11
50	0.51254	0.85866	0.59691	1.67530	1.16460	1.95106	10
51	0.51279	0.85851	0.59730	1.67419	1.16481	1.95011	9
52	0.51304	0.85836	0 59770	1.67309	1.16501	1.94916	8
53	0.51329	0 85821	0.59809	1.67198	1.16521	1.94821	7
54	0.51354	0.85806	0.59849	1.67088	1.16541	1.94726	6
55	0.51379	0.85792	0.59888	1.66978	1.16562	1.94632	5
56	0.51404	0.85777	0.59928	1.66867	1.16582	1.94537	4
57	0.51429	0.85762	0.59967	1.66757	1.16602	1.94443	3
58	0.51454	0.85747	0.60007	1.66647	1.16623	1.94349	2
59	0.51479	0.85732	0.60046	1.66538	1.16643	1.94254	1
60	0.51504	0.85717	0.60086	1.66428	1.16663	1.94160	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	See.	′

31°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.51504	0.85717	0.60086	1.66428	1.16663	1.94160	60
1	0.51529	0.85702	0.60126	1.66318	1.16684	1.94066	59
2	0.51554	0.85687	0.60165	1.66209	1.16704	1.93973	58
3	0.51579	0.85672	0.60205	1.66099	1.16725	1.93879	57
4	0.51604	0.85657	0.60245	1.63990	1.16745	1.93785	56
5	0.51628	0.85642	0.60284	1.65881	1.16766	1.93692	55
6	0.51653	0.85627	0.60324	1.65772	1.16786	1.93598	54
7	0.51678	0.85612	0.60364	1.65663	1.16806	1.93505	53
8	0.51703	0.85597	0.60403	1.65554	1.16827	1.93412	52
9	0.51728	0.85582	0.60443	1.65445	1.16848	1.93319	51
10	0.51753	0.85567	0.60483	1.65337	1.16868	1.93226	50
11	0.51778	0.85551	0.60522	1.65228	1.16889	1.93133	49
12	0.51803	0.85536	0.60562	1.65120	1.16909	1.93040	48
13	0.51828	0.85521	0.60602	1.65011	1.16930	1.92947	47
14	0.51852	0.85506	0.60642	1.64903	1.16950	1.92855	46
15	0.51877	0.85491	0.60681	1.64795	1.16971	1.92762	45
16	0.51902	0.85476	0.60721	1.64687	1.16992	1.92670	44
17	0.51927	0.85461	0.60761	1.64579	1.17012	1.92578	43
18	0.51952	0.85446	0.60801	1.64471	1.17033	1.92486	42
19	0.51977	0.85431	0.60841	1.64363	1.17054	1.92394	41
20	0.52002	0.85416	0.60881	1.64256	1.17075	1.92302	40
21	0.52026	0.85401	0.60921	1.64148	1.17095	1.92210	39
22	0.52051	0.85385	0.60960	1.64041	1.17116	1.92118	38
23	0.52076	0.85370	0.61000	1.63934	1.17137	1.92027	37
24	0.52101	0.85355	0.61040	1.63826	1.17158	1.91935	36
25	0.52126	0.85340	0.61080	1.63719	1.17178	1.91844	35
26	0.52151	0.85325	0.61120	1.63612	1.17199	1.91752	34
27	0.52175	0.85310	0.61160	1.63505	1.17220	1.91661	33
28	0.52200	0.85294	0.61200	1.63398	1.17241	1.91570	32
29	0.52225	0.85279	0.61240	1.63292	1.17262	1.91479	31
30	0.52250	0.85264	0.61280	1.63185	1.17283	1.91388	30
31	0.52275	0.85249	0.61320	1.63079	1.17304	1.91297	29
32	0.52299	0.85234	0.61360	1.62972	1.17325	1.91207	28
33	0.52324	0.85218	0.61400	1.62866	1.17346	1.91116	27
34	0.52349	0.85203	0.61440	1.62760	1.17367	1.91026	26
35	0.52374	0.85188	0.61480	1.62654	1.17388	1.90935	25
36	0.52399	0.85173	0.61520	1.62548	1.17409	1.90845	24
37	0.52423	0.85157	0.61561	1.62442	1.17430	1.90755	23
38	0.52448	0.85142	0.61601	1.62336	1.17451	1.90665	22
39	0.52473	0.85127	0.61641	1.62230	1.17472	1.90575	21
40	0.52498	0.85112	0.61681	1.62125	1.17493	1.90485	20
41	0.52522	0.85096	0.61721	1.62019	1.17514	1.90395	19
42	0.52547	0.85081	0.61761	1.61914	1.17535	1.90305	18
43	0.52572	0.85066	0.61801	1.61809	1.17556	1.90216	17
44	0.52597	0.85051	0.61842	1.61703	1.17577	1.90126	16
45	0.52621	0.85035	0.61882	1.61598	1.17598	1.90037	15
46	0.52646	0.85020	0.61922	1.61493	1.17620	1.89948	14
47	0.52671	0.85005	0.61962	1.61388	1.17641	1.89858	13
48	0.52696	0.84989	0.62003	1.61283	1.17662	1.89769	12
49	0.52720	0.84974	0.62043	1.61179	1.17683	1.89680	11
50	0.52745	0.84959	0.62083	1.61074	1.17704	1.89591	10
51	0.52770	0.84943	0.62124	1.60970	1.17726	1.89503	9
52	0.52794	0.84928	0.62164	1.60865	1.17747	1.89414	8
53	0.52819	0.84913	0.62204	1.60761	1.17768	1.89325	7
54	0.52844	0.84897	0.62245	1.60657	1.17790	1.89237	6
55	0.52869	0.84882	0.62285	1.60553	1.17811	1.89148	5
56	0.52893	0.84866	0.62325	1.60449	1.17832	1.89060	4
57	0.52918	0.84851	0.62366	1.60345	1.17854	1.88972	3
58	0.52943	0.84836	0.62406	1.60241	1.17875	1.88884	2
59	0.52967	0.84820	0.62446	1.60137	1.17896	1.88796	1
60	0.52992	0.84805	0.62487	1.60033	1.17918	1.88708	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

58°

32°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.52992	0.84805	0.62487	1.60033	1.17918	1.88708	60
1	0.53017	0.84789	0.62527	1.59930	1.17939	1.88620	59
2	0.53041	0.84774	0 62568	1.59826	1.17961	1.88532	58
3	0.53066	0.84759	0.62608	1.59723	1.17982	1.88445	57
4	0.53091	0.84743	0.62649	1.59620	1.18004	1.88357	56
5	0.53115	0.84728	0.62689	1 59517	1.18025	1.88270	55
6	0.53140	0.84712	0.62730	1.59414	1.18047	1.88183	54
7	0.53164	0.84697	0.62770	1.59311	1.18068	1.88095	53
8	0.53189	0.84681	0.62811	1.59208	1.18090	1.88008	52
9	0.53214	0.84666	0.62852	1.59105	1.18111	1.87921	51
10	0.53238	0 84650	0.62892	1.59002	1.18133	1.87834	50
11	0.53263	0.84635	0.62933	1.58900	1.18155	1.87748	49
12	0.53288	0.84619	0.62973	1.58797	1.18176	1.87661	48
13	0.53312	0.84604	0.63014	1.58695	1.18198	1.87574	47
14	0.53337	0.84588	0.63055	1.58593	1.18220	1.87488	46
15	0.53361	0.84573	0.63095	1.58490	1.18241	1.87401	45
16	0.53386	0.84557	0.63136	1.58388	1.18263	1.87315	44
17	0.53411	0.84542	0.63177	1.58286	1.18285	1.87229	43
18	0.53435	0.84526	0.63217	1.58184	1.18307	1.87142	42
19	0.53460	0.84511	0.63258	1.58083	1.18328	1.87056	41
20	0.53484	0.84495	0.63299	1.57981	1.18350	1.86970	40
21	0.53509	0.84480	0.63340	1.57879	1.18372	1.86885	39
22	0.53534	0.84464	0.63380	1.57778	1.18394	1.86799	38
23	0.53558	0.84448	0.63421	1.57676	1.18416	1.86713	37
24	0.53583	0.84433	0.63462	1.57575	1.18437	1.86627	36
25	0.53607	0.84417	0 63503	1.57474	1 18459	1.86542	35
26	0.53632	0.84402	0.63544	1.57372	1.18481	1.86457	34
27	0.53656	0.84386	0.63584	1.57271	1.18503	1.86371	33
28	0.53681	0.84370	0 63625	1.57170	1.18525	1.86286	32
29	0.53705	0.84355	0.63666	1.57069	1.18547	1.86201	31
30	0 53730	0.84339	0.63707	1.56969	1.18569	1.86116	30
31	0.53754	0.84324	0.63748	1.56868	1.18591	1.86031	29
32	0.53779	0.84308	0.63789	1.56767	1.18613	1.85946	28
33	0.53804	0.84292	0.63830	1.56667	1.18635	1.85861	27
34	0.53828	0.84277	0.63871	1.56566	1.18657	1.85777	26
35	0.53853	0.84261	0.63912	1.56466	1.18679	1.85692	25
36	0.53877	0.84245	0.63953	1.56366	1.18701	1.85608	24
37	0.53902	0.84230	0.63994	1.56265	1.18723	1.85523	23
38	0.53926	0.84214	0.64035	1.56165	1.18745	1.85439	22
39	0.53951	0.84198	0.64076	1.56065	1.18767	1.85355	21
40	0.53975	0.84182	0.64117	1.55966	1.18790	1.85271	20
41	0.54000	0.84167	0.64158	1.55866	1.18812	1.85187	19
42	0.54024	0.84151	0.64199	1.55766	1.18834	1.85103	18
43	0.54049	0.84135	0 64240	1.55666	1.18856	1.85019	17
44	0.54073	0.84120	0.64281	1.55567	1.18878	1.84935	16
45	0.54097	0.84104	0.64322	1.55467	1.18901	1.84852	15
46	0.54122	0.84088	0.64363	1.55368	1.18923	1.84768	14
47	0.54146	0.84072	0.64404	1.55269	1.18945	1.84685	13
48	0.54171	0.84057	0.64446	1.55170	1.18967	1.84601	12
49	0.54195	0.84041	0.64487	1.55071	1.18990	1.84518	11
50	0.54220	0.84025	0.64528	1.54972	1.19012	1.84435	10
51	0.54244	0.84009	0.64569	1.54873	1.19034	1.84352	9
52	0.54269	0.83994	0.64610	1.54774	1.19057	1.84269	8
53	0.54293	0.83978	0.64652	1.54675	1.19079	1.84186	7
54	0.54317	0.83962	0.64693	1.54576	1.19102	1.84103	6
55	0.54342	0.83946	0.64734	1.54478	1.19124	1.84020	5
56	0.54366	0.83930	0.64775	1.54379	1.19146	1.83938	4
57	0.54391	0.83915	0.64817	1.54281	1.19169	1.83855	3
58	0.54415	0.83899	0.64858	1.54183	1.19191	1.83773	2
59	0.54440	0.83883	0.64899	1.54085	1.19214	1.83690	1
60	0.54464	0.83867	0.64941	1.53986	1.19236	1.83608	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

33°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.54464	0.83867	0.64941	1.53986	1.19236	1.83608	60
1	0.54488	0.83851	0.64982	1.53888	1.19259	1.83526	59
2	0.54513	0.83835	0.65024	1.53791	1.19281	1.83344	58
3	0.54537	0.83819	0.65065	1.53693	1.19304	1.83362	57
4	0.54561	0.83804	0.65106	1.53595	1.19327	1.83280	56
5	0.54586	0.83788	0.65148	1.53497	1.19349	1.83198	55
6	0.54610	0.83772	0.65189	1.53400	1.19372	1.83116	54
7	0.54635	0.83756	0.65231	1.53302	1.19394	1.83034	53
8	0.54659	0.83740	0.65272	1.53205	1.19417	1.82953	52
9	0.54683	0.83724	0.65314	1.53107	1.19440	1.82871	51
10	0.54708	0.83708	0.65355	1.53010	1.19463	1.82790	50
11	0.54732	0.83692	0.65397	1.52913	1.19485	1.82709	49
12	0.54756	0.83676	0.65438	1.52816	1.19508	1.82627	48
13	0.54781	0.83660	0.65480	1.52719	1.19531	1.82546	47
14	0.54805	0.83645	0.65521	1.52622	1.19553	1.82465	46
15	0.54829	0.83629	0.65563	1.52525	1.19576	1.82384	45
16	0.54854	0.83613	0.65604	1.52429	1.19599	1.82303	44
17	0.54878	0.83597	0.65646	1.52332	1.19622	1.82222	43
18	0.54902	0.83581	0.65688	1.52235	1.19645	1.82142	42
19	0.54927	0.83565	0.65729	1.52139	1.19668	1.82061	41
20	0.54951	0.83549	0.65771	1.52043	1.19691	1.81981	40
21	0.54975	0.83533	0.65813	1.51946	1.19713	1.81900	39
22	0.54999	0.83517	0.65854	1.51850	1.19736	1.81820	38
23	0.55024	0.83501	0.65896	1.51754	1.19759	1.81740	37
24	0.55048	0.83485	0.65938	1.51658	1.19782	1.81659	36
25	0.55072	0.83469	0.65980	1.51562	1.19805	1.81579	35
26	0.55097	0.83453	0.66021	1.51466	1.19828	1.81499	34
27	0.55121	0.83437	0.66063	1.51370	1.19851	1.81419	33
28	0.55145	0.83421	0.66105	1.51275	1.19874	1.81340	32
29	0.55169	0.83405	0.66147	1.51179	1.19897	1.81260	31
30	0.55194	0.83389	0.66189	1.51084	1.19920	1.81180	30
31	0.55218	0.83373	0.66230	1.50988	1.19944	1.81101	29
32	0.55242	0.83356	0.66272	1.50893	1.19967	1.81021	28
33	0.55266	0.83340	0.66314	1.50797	1.19990	1.80942	27
34	0.55291	0.83324	0.66356	1.50702	1.20013	1.80862	26
35	0.55315	0.83308	0.66398	1.50607	1.20036	1.80783	25
36	0.55339	0.83292	0.66440	1.50512	1.20059	1.80704	24
37	0.55363	0.83276	0.66482	1.50417	1.20083	1.80625	23
38	0.55388	0.83260	0.66524	1.50322	1.20106	1.80546	22
39	0.55412	0.83244	0.66566	1.50228	1.20129	1.80467	21
40	0.55436	0.83228	0.66608	1.50133	1.20152	1.80388	20
41	0.55460	0.83212	0.66650	1.50038	1.20176	1.80309	19
42	0.55484	0.83195	0.66692	1.49944	1.20199	1.80231	18
43	0.55509	0.83179	0.66734	1.49849	1.20222	1.80152	17
44	0.55533	0.83163	0.66776	1.49755	1.20246	1.80074	16
45	0.55557	0.83147	0.66818	1.49661	1.20269	1.79995	15
46	0.55581	0.83131	0.66860	1.49566	1.20292	1.79917	14
47	0.55605	0.83115	0.66902	1.49472	1.20316	1.79839	13
48	0.55630	0.83098	0.66944	1.49378	1.20339	1.79761	12
49	0.55654	0.83082	0.66986	1.49284	1.20363	1.79682	11
50	0.55678	0.83066	0.67028	1.49190	1.20386	1.79604	10
51	0.55702	0.83050	0.67071	1.49097	1.20410	1.79527	9
52	0.55726	0.83034	0.67113	1.49003	1.20433	1.79449	8
53	0.55750	0.83017	0.67155	1.48909	1.20457	1.79371	7
54	0.55775	0.83001	0.67197	1.48816	1.20480	1.79293	6
55	0.55799	0.82985	0.67239	1.48722	1.20504	1.79216	5
56	0.55823	0.82969	0.67282	1.48629	1.20527	1.79138	4
57	0.55847	0.82953	0.67324	1.48536	1.20551	1.79061	3
58	0.55871	0.82936	0.67366	1.48442	1.20575	1.78984	2
59	0.55895	0.82920	0.67409	1.48349	1.20598	1.78906	1
60	0.55919	0.82904	0.67451	1.48256	1.20622	1.78829	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

34°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.55919	0.82904	0.67451	1.48256	1.20622	1.78829	60
1	0.55943	0.82887	0.67493	1.48163	1.20643	1.78752	59
2	0.55968	0.82871	0 67536	1.48070	1.20669	1.78675	58
3	0.55992	0.82855	0.67578	1 47977	1.20693	1.78598	57
4	0.56016	0.82839	0.67620	1.47885	1.20717	1.78521	56
5	0.56040	0.82822	0 67663	1.47792	1.20740	1.78445	55
6	0.56064	0.82806	0 67705	1.47699	1.20764	1.78368	54
7	0.56088	0.82790	0.67748	1.47607	1.20788	1.78291	53
8	0.56112	0.82773	0.67790	1.47514	1.20812	1.78215	52
9	0.56136	0.82757	0.67832	1.47422	1.20836	1.78138	51
10	0.56160	0.82741	0.67875	1.47330	1.20859	1.78062	50
11	0.56184	0.82724	0.67917	1.47238	1.20883	1.77986	49
12	0.56208	0.82708	0.67960	1.47146	1.20907	1.77910	48
13	0 56232	0.82692	0.68002	1.47053	1.20931	1.77833	47
14	0.56256	0.82675	0.68045	1.46962	1.20955	1.77757	46
15	0.56280	0.82659	0 68088	1.46870	1.20979	1.77681	45
16	0.5630	0.82643	0.68130	1.46778	1.21003	1.77606	44
17	0.56329	0.82626	0.68173	1.46686	1.21027	1.77530	43
18	0.56353	0.82610	0.68215	1.46595	1.21051	1.77454	42
19	0.56377	0.82593	0.68258	1.46503	1.21075	1.77378	41
20	0.56401	0.82577	0.68301	1.46411	1.21099	1.77303	40
21	0.56425	0.82561	0.68343	1.46320	1.21123	1.77227	39
22	0.56449	0.82544	0.68386	1.46229	1.21147	1.77152	38
23	0.56473	0.82528	0.68429	1.46137	1.21171	1.77077	37
24	0.56497	0.82511	0.68471	1.46046	1.21195	1.77001	36
25	0.56521	0.82495	0.68514	1.45955	1.21220	1.76926	35
26	0.56545	0 82478	0.68557	1.45864	1.21244	1.76851	34
27	0.56569	0.82462	0.68600	1.45773	1.21268	1.76776	33
28	0.56593	0.82446	0.68642	1.45682	1.21292	1.76701	32
29	0.56617	0.82429	0 68685	1.45592	1.21316	1.76626	31
30	0.56641	0.82413	0.68728	1.45501	1.21341	1.76552	30
31	0.56665	0.82396	0.68771	1.45410	1.21365	1.76477	29
32	0.56689	0.82380	0 68814	1.45320	1.21389	1.76402	28
33	0.56713	0.82363	0.68857	1.45229	1 21414	1.76328	27
34	0.56736	0.82347	0.68900	1.45139	1 21438	1.76253	26
35	0.56760	0.82330	0.68942	1 45049	1.21462	1.76179	25
36	0.56784	0 82314	0.68985	1 44958	1.21487	1.76105	24
37	0.56808	0.82297	0.69028	1.44868	1.21511	1.76031	23
38	0.56832	0.82281	0.69071	1.44778	1.21535	1.75956	22
39	0.56856	0.82264	0.69114	1.44688	1.21560	1.75882	21
40	0.56880	0.82248	0.69157	1.44598	1.21584	1.75808	20
41	0.56904	0.82231	0.69200	1.44508	1.21609	1.75734	19
42	0.56928	0.82214	0.69243	1.44418	1.21633	1.75661	18
43	0.56952	0.82198	0.69286	1.44329	1.21658	1.75587	17
44	0.56976	0.82181	0.69329	1.44239	1.21682	1.75513	16
45	0.57000	0.82165	0.69372	1.44149	1.21707	1.75440	15
46	0.57024	0.82148	0.69416	1.44060	1.21731	1.75366	14
47	0.57047	0.82132	0.69459	1.43970	1.21756	1.75293	13
48	0.57071	0.82115	0.69502	1.43881	1.21781	1.75219	12
49	0.57095	0.82098	0.69545	1.43792	1.21805	1.75146	11
50	0.57119	0.82082	0.69588	1.43703	1.21830	1.75073	10
51	0.57143	0.82065	0.69631	1.43614	1.21855	1.75000	9
52	0.57167	0.82048	0.69675	1.43525	1.21879	1.74927	8
53	0 57191	0 82032	0.69718	1 43436	1.21904	1.74854	7
54	0.57215	0.82015	0.69761	1.43347	1.21929	1.74781	6
55	0.57238	0.81999	0.69804	1.43258	1.21953	1.74708	5
56	0.57262	0.81982	0.69847	1.43169	1.21978	1.74635	4
57	0.57286	0.81965	0.69891	1.43080	1.22003	1.74562	3
58	0.57310	0.81949	0.69934	1.42992	1.22028	1.74490	2
59	0.57334	0.81932	0.69977	1.42903	1.22053	1.74417	1
60	0.57358	0.81915	0.70021	1.42815	1.22077	1.74345	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

55°

35 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.57358	0.81915	0.70021	1.42815	1.22077	1.74345	60
1	0.57381	0.81899	0.70064	1.42726	1.22102	1.74272	59
2	0.57405	0.81882	0.70107	1.42638	1.22127	1.74200	58
3	0.57429	0.81865	0.70151	1.42550	1.22152	1.74128	57
4	0.57453	0.81848	0.70194	1.42462	1.22177	1.74056	56
5	0.57477	0.81832	0.70238	1.42374	1.22202	1.73983	55
6	0.57501	0.81815	0.70281	1.42286	1.22227	1.73911	54
7	0.57524	0.81798	0.70325	1.42198	1.22252	1.73840	53
8	0.57548	0.81782	0.70368	1.42110	1.22277	1.73768	52
9	0.57572	0.81765	0.70412	1.42022	1.22302	1.73696	51
10	0.57596	0.81748	0.70455	1.41934	1.22327	1.73624	50
11	0.57619	0.81731	0.70499	1.41847	1.22352	1.73552	49
12	0.57643	0.81714	0.70542	1.41759	1.22377	1.73481	48
13	0.57667	0.81698	0.70586	1.41672	1.22402	1.73409	47
14	0.57691	0.81681	0.70629	1.41584	1.22428	1.73338	46
15	0.57715	0.81664	0.70673	1.41497	1.22453	1.73267	45
16	0.57738	0.81647	0.70717	1.41409	1.22478	1.73195	44
17	0.57762	0.81631	0.70760	1.41322	1.22503	1.73124	43
18	0.57786	0.81614	0.70804	1.41235	1.22528	1.73053	42
19	0.57810	0.81597	0.70848	1.41148	1.22554	1.72982	41
20	0.57833	0.81580	0.70891	1.41061	1.22579	1.72911	40
21	0.57857	0.81563	0.70935	1.40974	1.22604	1.72840	39
22	0.57881	0.81546	0.70979	1.40887	1.22629	1.72769	38
23	0.57904	0.81530	0.71023	1.40800	1.22655	1.72698	37
24	0.57928	0.81513	0.71066	1.40714	1.22680	1.72628	36
25	0.57952	0.81496	0.71110	1.40627	1.22706	1.72557	35
26	0.57976	0.81479	0.71154	1.40540	1.22731	1.72487	34
27	0.57999	0.81462	0.71198	1.40454	1.22756	1.72416	33
28	0.58023	0.81445	0.71242	1.40367	1.22782	1.72346	32
29	0.58047	0.81428	0.71285	1.40281	1.22807	1.72275	31
30	0.58070	0.81412	0.71329	1.40195	1.22833	1.72205	30
31	0.58094	0.81395	0.71373	1.40109	1.22858	1.72135	29
32	0.58118	0.81378	0.71417	1.40022	1.22884	1.72065	28
33	0.58141	0.81361	0.71461	1.39936	1.22909	1.71995	27
34	0.58165	0.81344	0.71505	1.39850	1.22935	1.71925	26
35	0.58189	0.81327	0.71549	1.39764	1.22960	1.71855	25
36	0.58212	0.81310	0.71593	1.39679	1.22986	1.71785	24
37	0.58236	0.81293	0.71637	1.39593	1.23012	1.71715	23
38	0.58260	0.81276	0.71681	1.39507	1.23037	1.71646	22
39	0.58283	0.81259	0.71725	1.39421	1.23063	1.71576	21
40	0.58307	0.81242	0.71769	1.39336	1.23089	1.71506	20
41	0.58330	0.81225	0.71813	1.39250	1.23114	1.71437	19
42	0.58354	0.81208	0.71857	1.39165	1.23140	1.71368	18
43	0.58378	0.81191	0.71901	1.39079	1.23166	1.71298	17
44	0.58401	0.81174	0.71946	1.38994	1.23192	1.71229	16
45	0.58425	0.81157	0.71990	1.38909	1.23217	1.71160	15
46	0.58449	0.81140	0.72034	1.38824	1.23243	1.71091	14
47	0.58472	0.81123	0.72078	1.38738	1.23269	1.71022	13
48	0.58496	0.81106	0.72122	1.38653	1.23295	1.70953	12
49	0.58519	0.81089	0.72167	1.38568	1.23321	1.70884	11
50	0.58543	0.81072	0.72211	1.38484	1.23347	1.70815	10
51	0.58567	0.81055	0.72255	1.38399	1.23373	1.70746	9
52	0.58590	0.81038	0.72299	1.38314	1.23398	1.70677	8
53	0.58614	0.81021	0.72344	1.38229	1.23424	1.70609	7
54	0.58637	0.81004	0.72388	1.38145	1.23450	1.70540	6
55	0.58661	0.80987	0.72432	1.38060	1.23476	1.70472	5
56	0.58684	0.80970	0.72477	1.37976	1.23502	1.70403	4
57	0.58708	0.80953	0.72521	1.37891	1.23529	1.70335	3
58	0.58731	0.80936	0.72565	1.37807	1.23555	1.70267	2
59	0.58755	0.80919	0.72610	1.37722	1.23581	1.70198	1
60	0.58779	0.80902	0.72654	1.37638	1.23607	1.70130	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

54 °

36°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.58779	0.80902	0.72634	1.37638	1.23607	1.70130	60
1	0.58802	0.80885	0.72699	1.37554	1.23633	1.70062	59
2	0.58826	0.80867	0.72743	1.37470	1.23659	1.69994	58
3	0.58849	0.80850	0.72788	1.37386	1.23685	1.69926	57
4	0.58873	0.80833	0.72832	1.37302	1.23711	1.69858	56
5	0.58896	0.80816	0.72877	1.37218	1.23738	1.69790	55
6	0.58920	0.80799	0.72921	1.37134	1.23764	1.69723	54
7	0.58943	0.80782	0.72966	1.37050	1.23790	1.69655	53
8	0.58967	0.80765	0.73010	1.36967	1.23816	1.69587	52
9	0.58990	0.80748	0.73055	1.36883	1.23843	1.69520	51
10	0.59014	0.80730	0.73100	1.36800	1.23869	1.69452	50
11	0.59037	0.80713	0.73144	1.36716	1.23895	1 69385	49
12	0 59061	0.80696	0.73189	1.36633	1.23922	1.69318	48
13	0.59084	0.80679	0.73234	1.36549	1.23948	1.69250	47
14	0.59108	0.80662	0.73278	1.36466	1.23975	1.69183	46
15	0.59131	0.80644	0.73323	1.36383	1.24001	1.69116	45
16	0.59154	0.80627	0.73368	1.36300	1.24028	1.69049	44
17	0.59178	0.80610	0.73413	1.36217	1.24054	1.68982	43
18	0.59201	0.80593	0.73457	1.36134	1.24081	1.68915	42
19	0.59225	0.80576	0.73502	1.36051	1.24107	1.68848	41
20	0.59248	0.80558	0.73547	1.35968	1.24134	1.68782	40
21	0.59272	0.80541	0.73592	1.35885	1.24160	1.68715	39
22	0 59295	0.80524	0.73637	1.35802	1.24187	1.68648	38
23	0.59318	0.80507	0.73681	1.35719	1.24213	1.68582	37
24	0.59342	0.80489	0.73726	1.35637	1.24240	1 68515	36
25	0.59365	0.80472	0 73771	1.35554	1.24267	1.68449	35
26	0 59389	0.80455	0.73816	1.35472	1.24293	1.68382	34
27	0.59412	0.80438	0.73861	1.35389	1.24320	1.68316	33
28	0.59436	0.80420	0.73906	1.35307	1.24347	1.68250	32
29	0.59459	0 80403	0.73951	1.35224	1.24373	1.68183	31
30	0.59482	0.80386	0.73996	1.35142	1.24400	1.68117	30
31	0.59506	0.80368	0.74041	1.35060	1.24427	1.68051	29
32	0.59529	0.80351	0.74086	1.34978	1.24454	1.67985	28
33	0.59552	0.80334	0.74131	1.34896	1.24481	1 67919	27
34	0.59576	0.80316	0.74176	1.34814	1.24508	1.67853	26
35	0.59599	0.80299	0.74221	1.34732	1.24534	1.67788	25
36	0.59622	0.80282	0.74267	1.34650	1.24561	1.67722	24
37	0.59646	0.80264	0.74312	1.34568	1.24588	1.67656	23
38	0.59669	0.80247	0.74357	1.34487	1.24615	1.67591	22
39	0.59693	0.80230	0.74402	1.34405	1.24642	1.67525	21
40	0.59716	0.80212	0.74447	1.34323	1.24669	1.67460	20
41	0.59739	0.80195	0.74492	1.34242	1.24696	1.67394	19
42	0.59763	0.80178	0.74538	1.34160	1.24723	1.67329	18
43	0.59786	0.80160	0.74583	1.34079	1.24750	1.67264	17
44	0.59809	0.80143	0.74628	1.33998	1.24777	1.67198	16
45	0.59832	0.80125	0.74674	1.33916	1.24804	1.67133	15
46	0.59856	0.80108	0.74719	1.33835	1.24832	1.67068	14
47	0.59879	0.80091	0.74764	1.33754	1.24859	1.67003	13
48	0.59902	0.80073	0.74810	1.33673	1.24886	1.66938	12
49	0.59926	0.8005	0.74855	1.33592	1.24913	1.66873	11
50	0.59949	0.80038	0.74900	1.33511	1.24940	1.66809	10
51	0.59972	0.80021	0.74946	1.33430	1.24967	1.66744	9
52	0.59995	0.80003	0.74991	1.33349	1.24995	1.66679	8
53	0.60019	0.79986	0.75037	1.33268	1.25022	1.66615	7
54	0.60042	0.79968	0.75082	1.33187	1.25049	1.66550	6
55	0.60065	0.79951	0.75128	1.33107	1.25077	1.66486	5
56	0.60089	0.79934	0.75173	1.33026	1.25104	1.66421	4
57	0.60112	0.79916	0.75219	1.32946	1.25131	1.66357	3
58	0.60135	0.79899	0.75264	1.32865	1.25159	1.66292	2
59	0.60158	0.79881	0.75310	1.32785	1.25186	1.66228	1
60	0.60182	0.79864	0.75355	1.32704	1.25214	1.66164	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

37 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.60182	0.79864	0.75355	1.32704	1.25214	1.66164	60
1	0.60205	0.79846	0.75401	1.32624	1.25241	1.66100	59
2	0.60228	0.79829	0.75447	1.32544	1.25266	1.66036	58
3	0.60251	0.79811	0.75492	1.32464	1.25296	1.65972	57
4	0.60274	0.79793	0.75538	1.32384	1.25324	1.65908	56
5	0.60298	0.79776	0.75584	1.32304	1.25351	1.65844	55
6	0.60321	0.79758	0.75629	1.32224	1.25379	1.65780	54
7	0.60344	0.79741	0.75675	1.32144	1.25406	1.65717	53
8	0.60367	0.79723	0.75721	1.32064	1.25434	1.65653	52
9	0.60390	0.79706	0.75767	1.31984	1.25462	1.65589	51
10	0 60414	0.79688	0.75812	1.31904	1.25489	1.65526	50
11	0.60437	0.79671	0.75858	1.31825	1.25517	1.65462	49
12	0.60460	0.79653	0.75904	1.31745	1.25545	1.65399	48
13	0.60483	0.79635	0.75950	1.31666	1.25572	1.65335	47
14	0.60506	0.79618	0.75996	1.31586	1.25600	1.65272	46
15	0.60529	0.79600	0.76042	1.31507	1.25628	1.65209	45
16	0.60553	0.79583	0.76088	1.31427	1 25656	1.65146	44
17	0.60576	0.79565	0.76134	1.31348	1.25683	1.65083	43
18	0.60599	0.79547	0.76180	1.31269	1.25711	1.65020	42
19	0.60622	0.79530	0.76226	1.31190	1.25739	1.64957	41
20	0.60645	0.79512	0.76272	1.31110	1.25767	1 64894	40
21	0.60668	0.79494	0.76318	1.31031	1.25795	1.64831	39
22	0.60691	0.79477	0.76364	1.30952	1.25823	1.64768	38
23	0.60714	0.79459	0 76410	1.30873	1.25851	1.64705	37
24	0.60738	0.79441	0.76456	1.30795	1.25879	1.64643	36
25	0.60761	0.79424	0.76502	1.30716	1.25907	1.64580	35
26	0.60784	0.79406	0.76548	1.30637	1.25935	1.64518	34
27	0 60807	0.79388	0.76594	1.30558	1.25963	1.64455	33
28	0.60830	0.79371	0.76640	1.30480	1.25991	1 64393	32
29	0.60853	0.79353	0.76686	1.30401	1.26019	1.64330	31
30	0.60876	0.79335	0.76733	1.30323	1.26047	1.64268	30
31	0.60899	0.79318	0.76779	1.30244	1.26075	1.64206	29
32	0.60922	0.79300	0.76825	1.30166	1.26104	1.64144	28
33	0.60945	0.79282	0.76871	1.30087	1.26132	1.64081	27
34	0.60968	0.79264	0.76918	1.30009	1.26160	1.64019	26
35	0.60991	0.79247	0 76964	1.29931	1.26188	1.63957	25
36	0.61015	0.79229	0.77010	1.29853	1.26216	1.63895	24
37	0.61038	0.79211	0.77057	1.29775	1.26245	1.63834	23
38	0.61061	0.79193	0.77103	1 29696	1.26273	1.63772	22
39	0.61034	0.79176	0.77149	1.29618	1.26301	1.63710	21
40	0.61107	0 79158	0.77196	1.29541	1.26330	1.63648	20
41	0.61130	0.79140	0.77242	1.29463	1.26358	1.63587	19
42	0.61153	0.79122	0 77289	1.29385	1.26387	1.63525	18
43	0.61176	0.79105	0.77335	1.29307	1.26415	1.63464	17
44	0.61199	0.79087	0.77382	1.29229	1.29443	1.63402	16
45	0.61222	0.79069	0.77428	1.29152	1.26472	1.63341	15
46	0.61245	0.79051	0.77475	1.29074	1.26500	1.63279	14
47	0.61268	0.79033	0.77521	1.28997	1.26529	1.63218	13
48	0.61291	0.79016	0.77568	1.28919	1.26557	1.63157	12
49	0.61314	0.78998	0.77615	1.28842	1.26586	1.63096	11
50	0.61337	0.78980	0 77661	1.28764	1.26615	1.63035	10
51	0.61360	0.78962	0.77708	1.28687	1.26643	1.62974	9
52	0.61383	0.78944	0.77754	1.28610	1.26672	1.62913	8
53	0.61406	0.78926	0.77801	1.28533	1.26701	1.62852	7
54	0.61429	0.78908	0.77848	1.28456	1.26729	1.62791	6
55	0.61451	0.78891	0.77895	1.28379	1.26758	1.62730	5
56	0.61474	0.78873	0.77941	1.28302	1.26787	1.62669	4
57	0.61497	0.78855	0.77988	1.28225	1.26815	1.62609	3
58	0.61520	0.78837	0.78035	1.28148	1.26844	1.62548	2
59	0.61543	0.78819	0.78082	1.28071	1.26873	1.62487	1
60	0.61566	0.78801	0.78129	1.27994	1.26902	1.62427	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

52 °

38 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.61566	0.78801	0.78129	1.27994	1.26922	1.62427	60
1	0.61589	0.78783	0.78175	1.27917	1.26931	1.62366	59
2	0.61612	0.78765	0.78222	1.27841	1.26960	1.62306	58
3	0.61635	0.78747	0.78269	1.27764	1.26988	1.62246	57
4	0.61658	0.78729	0.78316	1.27688	1.27017	1.62185	56
5	0.61681	0.78711	0.78363	1.27611	1.27046	1.62125	55
6	0.61704	0.78694	0.78410	1.27535	1.27075	1.62065	54
7	0.61726	0.78676	0.78457	1.27458	1.27104	1.62005	53
8	0.61749	0.78658	0.78504	1.27382	1.27133	1.61945	52
9	0.61772	0.78640	0.78551	1.27306	1.27162	1.61885	51
10	0.61795	0.78622	0.78598	1.27230	1.27191	1.61825	50
11	0.61818	0.78604	0.78645	1.27153	1.27221	1.61765	49
12	0.61841	0.78586	0.78692	1.27077	1.27250	1.61705	48
13	0.61864	0.78568	0.78739	1.27001	1.27279	1.61646	47
14	0.61887	0.78550	0.78786	1.26925	1.27308	1.61586	46
15	0.61909	0.78532	0.78834	1.26849	1.27337	1.61526	45
16	0.61932	0.78514	0.78881	1.26774	1.27366	1.61467	44
17	0.61955	0.78496	0.78928	1.26698	1.27396	1.61407	43
18	0.61978	0.78478	0.78975	1.26621	1.27425	1.61348	42
19	0.62001	0.78460	0.79022	1.26546	1.27454	1.61288	41
20	0.62024	0.78442	0.79070	1.26471	1.27483	1.61229	40
21	0.62046	0.78424	0.79117	1.26395	1.27513	1.61170	39
22	0.62069	0.78405	0.79164	1.26319	1.27542	1.61111	38
23	0.62092	0.78387	0.79212	1.26244	1.27572	1.61051	37
24	0.62114	0.78369	0.79259	1.26169	1.27601	1.60992	36
25	0.62138	0.78351	0.79306	1.26093	1.27630	1.60933	35
26	0.62160	0.78333	0.79354	1.26018	1.27660	1.60874	34
27	0.62183	0.78315	0.79401	1.25943	1.27689	1.60815	33
28	0.62206	0.78297	0.79449	1.25867	1.27719	1.60756	32
29	0.62229	0.78279	0.79496	1.25792	1.27748	1.60698	31
30	0.62251	0.78261	0.79544	1.25717	1.27778	1.60639	30
31	0.62274	0.78243	0.79591	1.25642	1.27807	1.60580	29
32	0.62297	0.78225	0.79639	1.25567	1.27837	1.60521	28
33	0.62320	0.78206	0.79686	1.25492	1.27867	1.60463	27
34	0.62342	0.78188	0.79734	1.25417	1.27896	1.60404	26
35	0.62365	0.78170	0.79781	1.25343	1.27926	1.60346	25
36	0.62388	0.78152	0.79829	1.25268	1.27956	1.60287	24
37	0.62411	0.78134	0.79877	1.25193	1.27985	1.60229	23
38	0.62433	0.78116	0.79924	1.25118	1.28015	1.60171	22
39	0.62456	0.78098	0.79972	1.25044	1.28045	1.60112	21
40	0.62479	0.78079	0.80020	1.24969	1.28075	1.60054	20
41	0.62502	0.78061	0.80067	1.24895	1.28105	1.59996	19
42	0.62524	0.78043	0.80115	1.24820	1.28134	1.59938	18
43	0.62547	0.78025	0.80163	1.24746	1.28164	1.59880	17
44	0.62570	0.78007	0.80211	1.24672	1.28194	1.59822	16
45	0.62592	0.77988	0.80258	1.24597	1.28224	1.59764	15
46	0.62615	0.77970	0.80306	1.24523	1.28254	1.59706	14
47	0.62638	0.77952	0.80354	1.24449	1.28284	1.59648	13
48	0.62660	0.77934	0.80402	1.24375	1.28314	1.59590	12
49	0.62683	0.77916	0.80450	1.24301	1.28344	1.59533	11
50	0.62706	0.77897	0.80498	1.24227	1.28374	1.59475	10
51	0.62728	0.77879	0.80546	1.24153	1.28404	1.59418	9
52	0.62751	0.77861	0.80594	1.24079	1.28434	1.59360	8
53	0.62774	0.77843	0.80642	1.24005	1.28464	1.59302	7
54	0.62796	0.77824	0.80690	1.23931	1.28495	1.59245	6
55	0.62819	0.77806	0.80738	1.23858	1.28525	1.59188	5
56	0.62842	0.77788	0.80786	1.23784	1.28555	1.59130	4
57	0.62864	0.77769	0.80834	1.23710	1.28585	1.59073	3
58	0.62887	0.77751	0.80882	1.23637	1.28615	1.59016	2
59	0.62909	0.77733	0.80930	1.23563	1.28646	1.58959	1
60	0.62932	0.77715	0.80978	1.23490	1.28676	1.58902	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

39 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.62932	0.77715	0.80978	1.23490	1.28676	1.58902	60
1	0.62955	0.77696	0.81027	1.23416	1.28706	1.58845	59
2	0.62977	0.77678	0.81075	1.23343	1 28737	1.58788	58
3	0.63000	0.77660	0 81123	1.23270	1.28767	1.58731	57
4	0.63022	0.77641	0.81171	1.23196	1.28797	1.58674	56
5	0.63045	0.77623	0.81220	1.23123	1.28828	1.58617	55
6	0.63068	0.77605	0.81268	1.23050	1.28858	1.58560	54
7	0.63090	0.77586	0.81316	1.22977	1.28889	1.58503	53
8	0.63113	0.77568	0.81364	1.22904	1.28919	1.58447	52
9	0.63135	0.77550	0.81413	1.22831	1.28950	1.58390	51
10	0.63158	0.77531	0.81461	1.22758	1.28980	1.58333	50
11	0.63180	0.77513	0.81510	1.22685	1.29011	1.58277	49
12	0.63203	0.77494	0.81558	1.22612	1.29042	1.58221	48
13	0.63225	0.77476	0.81606	1.22539	1.29072	1.58164	47
14	0.63248	0.77458	0.81655	1.22467	1.29103	1.58108	46
15	0.63271	0.77439	0.81703	1.22394	1.29133	1.58051	45
16	0.63293	0.77421	0 81752	1.22321	1.29164	1.57995	44
17	0.63316	0.77402	0.81800	1.22249	1.29195	1.57939	43
18	0.63338	0.77384	0.81849	1.22176	1.29226	1.57883	42
19	0.63361	0.77366	0.81898	1.22104	1.29256	1.57827	41
20	0.63383	0 77347	0.81946	1.22031	1.29287	1.57771	40
21	0.63406	0.77329	0.81995	1.21959	1.29318	1.57715	39
22	0.63428	0.77310	0.82044	1.21887	1.29349	1.57659	38
23	0.63451	0.77292	0 82092	1.21814	1.29380	1.57603	37
24	0.63473	0.77273	0.82141	1 21742	1.29411	1.57547	36
25	0.63496	0.77255	0.82190	1.21670	1.29442	1.57491	35
26	0.63518	0.77236	0.82238	1.21598	1.29473	1.57436	34
27	0.63540	0.77218	0.82287	1.21526	1.29504	1.57380	33
28	0.63563	0.77199	0.82336	1.21454	1.29535	1.57324	32
29	0.63585	0.77181	0.82385	1.21382	1.29566	1.57269	31
30	0.63608	0.77162	0 82434	1.21310	1.29597	1.57213	30
31	0.63630	0.77144	0.82483	1.21238	1.29628	1.57158	29
32	0.63653	0.77125	0.82531	1.21166	1.29659	1.57103	28
33	0.63675	0.77107	0.82580	1.21094	1.29690	1.57047	27
34	0.63698	0.77088	0.82629	1.21023	1.29721	1.56992	26
35	0.63720	0.77070	0.82678	1.20951	1.29752	1.56937	25
36	0.63742	0.77051	0.82727	1.20879	1.29784	1.56881	24
37	0.63765	0.77033	0.82776	1.20808	1.29815	1.56826	23
38	0.63787	0.77014	0.82825	1.20736	1.29846	1.56771	22
39	0.63810	0.76996	0.82874	1.20665	1.29877	1.56716	21
40	0.63832	0.76977	0.82923	1.20593	1.29909	1.56661	20
41	0.63854	0.76959	0.82972	1.20522	1.29940	1.56606	19
42	0.63877	0.76940	0.83022	1.20451	1.29971	1.56551	18
43	0.63899	0.76921	0.83071	1.20379	1.30003	1.56497	17
44	0.63922	0.76903	0.83120	1.20308	1.30034	1.56442	16
45	0.63944	0.76884	0.83169	1.20237	1.30066	1.56387	15
46	0.63966	0.76866	0.83218	1.20166	1.30097	1.56332	14
47	0.63989	0.76847	0.83268	1.20095	1.30129	1.56278	13
48	0.64011	0.76828	0.83317	1.20024	1.30160	1.56223	12
49	0.64033	0.76810	0.83366	1.19953	1.30192	1.56169	11
50	0.64056	0.76791	0.83415	1.19882	1.30223	1.56114	10
51	0.64078	0.76772	0.83465	1.19811	1.30255	1.56060	9
52	0.64100	0.76754	0.83514	1.19740	1.30287	1.56005	8
53	0.64123	0.76735	0.83564	1.19669	1.30318	1 55951	7
54	0.64145	0.76717	0.83613	1.19599	1.30350	1.55897	6
55	0.64167	0.76698	0.83662	1.19528	1.30382	1.55843	5
56	0.64190	0.76679	0.83712	1.19457	1.30413	1.55789	4
57	0.64212	0.76661	0.83761	1.19387	1.30445	1.55734	3
58	0.64234	0.76642	0.83811	1.19316	1.30477	1.55680	2
59	0.64256	0.76623	0.83860	1.19246	1.30509	1.55626	1
60	0.64279	0.76604	0.83910	1.19175	1.30541	1.55572	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

50 °

40 °

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0 64279	0.76604	0.83910	1.19175	1.30541	1.55572	60
1	0.64301	0.76586	0.83960	1.19105	1.30573	1.55518	59
2	0.64323	0.76567	0.84009	1.19035	1 30605	1.55465	58
3	0.64346	0.76548	0.84059	1 18964	1 30636	1.55411	57
4	0.64368	0.76530	0.84108	1.18894	1.30668	1.55357	56
5	0.64390	0.76511	0.84158	1.18824	1 30700	1 55303	55
6	0.64412	0.76492	0 84208	1.18754	1.30732	1.55250	54
7	0.64435	0.76473	0.84258	1.18684	1.30764	1.55196	53
8	0.64457	0.76455	0.84307	1.18614	1.30796	1.55143	52
9	0.64479	0.76436	0.84357	1.18544	1.30829	1.55089	51
10	0 64501	0.76417	0.84407	1.18474	1.30861	1.55035	50
11	0.64524	0.76398	0.84457	1.18404	1.30893	1.54982	49
12	0.64546	0.76380	0.84507	1.18334	1.30925	1.54929	48
13	0.64568	0.76361	0.84556	1.18264	1.30957	1.54876	47
14	0.64590	0.76342	0.84606	1.18194	1.30989	1.54822	46
15	0.64612	0.76323	0.84656	1.18125	1.31022	1.54769	45
16	0.64635	0.76304	0.84706	1.18055	1.31054	1.54716	44
17	0.64657	0.76286	0 84756	1.17986	1.31086	1.54663	43
18	0.64679	0.76267	0.84806	1.17916	1.31119	1.54610	42
19	0.64701	0.76248	0.84856	1.17846	1.31151	1.54557	41
20	0.64723	0.76229	0.84906	1.17777	1.31183	1.54504	40
21	0.64746	0.76210	0.84956	1.17708	1.31216	1.54451	39
22	0.64768	0.76192	0.85006	1.17638	1.31248	1.54398	38
23	0.64790	0.76173	0.85057	1.17569	1.31281	1.54345	37
24	0.64812	0.76154	0.85107	1.17500	1.31313	1.54292	36
25	0.64834	0.76135	0.85157	1.17430	1 31346	1.54240	35
26	0.64856	0.76116	0.85207	1.17361	1.31378	1.54187	34
27	0.64878	0.76097	0.85257	1.17292	1.31411	1.54134	33
28	0.64901	0.76078	0.85308	1.17223	1 31443	1.54082	32
29	0.64923	0.76059	0.85358	1.17154	1.31476	1.54029	31
30	0.64945	0 76041	0.85408	1.17085	1.31509	1.53977	30
31	0.64967	0.76022	0.85458	1.17016	1.31541	1.53924	29
32	0.64989	0.76003	0.85509	1.16947	1.31574	1.53872	28
33	0.65011	0.75984	0.85559	1.16878	1.31607	1.53820	27
34	0.65033	0.75965	0.85609	1.16809	1.31640	1.53768	26
35	0.65055	0.75946	0.85660	1.16741	1.31672	1.53715	25
36	0.65077	0.75927	0.85710	1 16672	1.31705	1.53663	24
37	0.65100	0.75908	0.85761	1.16603	1.31738	1.53611	23
38	0.65122	0.75889	0.85811	1.16535	1.31771	1.53559	22
39	0.65144	0.75870	0.85862	1.16466	1.31804	1.53507	21
40	0.65166	0.75851	0.85912	1.16398	1.31837	1.53455	20
41	0.65188	0.75832	0.85963	1.16329	1.31870	1.53403	19
42	0.65210	0.75813	0.86014	1.16261	1.31903	1.53351	18
43	0.65232	0.75794	0.86064	1.16192	1 31936	1.53299	17
44	0.65254	0.75775	0.86115	1.16124	1.31969	1 53247	16
45	0.65276	0.75756	0.86166	1.16056	1.32002	1.53196	15
46	0.65298	0.75738	0.86216	1.15987	1.32035	1.53144	14
47	0.65320	0 75719	0.86267	1.15919	1.32068	1.53092	13
48	0.65342	0 75700	0.86318	1.15851	1.32101	1.53041	12
49	0 65364	0.75680	0.86368	1.15783	1.32134	1.52989	11
50	0 65386	0.75661	0.86419	1.15715	1.32168	1.52938	10
51	0.65408	0.75642	0.86470	1.15647	1.32201	1.52886	9
52	0.65430	0.75623	0.86521	1.15579	1.32234	1.52835	8
53	0.65452	0.75604	0.86572	1 15511	1.32267	1.52784	7
54	0.65474	0.75585	0.86623	1.15443	1.32301	1.52732	6
55	0.65496	0.75566	0.86674	1.15375	1.32334	1.52681	5
56	0.65518	0.75547	0.86725	1.15308	1.32368	1.52630	4
57	0.65540	0.75528	0.86776	1.15240	1.32401	1.52579	3
58	0.65562	0.75509	0.86827	1.15172	1.32434	1.52527	2
59	0.65584	0.75490	0.86878	1.15104	1.32468	1.52476	1
60	0.65606	0.75471	0.86929	1.15037	1.32501	1.52425	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

49 °

41°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.65606	0.75471	0.86929	1.15037	1.32501	1.52425	60
1	0.65628	0.75432	0.86980	1.14969	1.32535	1.52374	59
2	0.65650	0.75433	0.87031	1.14902	1.32568	1.52323	58
3	0.65672	0.75414	0.87082	1.14834	1.32602	1.52273	57
4	0.65694	0.75395	0.87133	1.14767	1.32636	1.52222	56
5	0.65716	0.75375	0.87184	1.14699	1.32669	1.52171	55
6	0.65738	0.75356	0.87236	1.14632	1.32703	1.52120	54
7	0.65759	0.75337	0.87287	1.14565	1.32737	1.52069	53
8	0.65781	0.75318	0.87338	1.14498	1.32770	1.52019	52
9	0.65803	0.75299	0.87389	1.14430	1.32804	1.51968	51
10	0.65825	0.75280	0.87441	1.14363	1.32838	1.51918	50
11	0.65847	0.75261	0.87492	1.14296	1.32872	1.51867	49
12	0.65869	0.75241	0.87543	1.14229	1.32905	1.51817	48
13	0.65891	0.75222	0.87595	1.14162	1.32939	1.51766	47
14	0.65913	0.75203	0.87646	1.14095	1.32973	1.51716	46
15	0.65935	0.75184	0.87698	1.14028	1.33007	1.51665	45
16	0.65956	0.75165	0.87749	1.13961	1.33041	1.51615	44
17	0.65978	0.75146	0.87801	1.13894	1.33075	1.51565	43
18	0.66000	0.75126	0.87852	1.13828	1.33109	1.51515	42
19	0.66022	0.75107	0.87904	1.13761	1.33143	1.51465	41
20	0.66044	0.75088	0.87955	1.13694	1.33177	1.51415	40
21	0.66066	0.75069	0.88007	1.13627	1.33211	1.51364	39
22	0.66088	0.75050	0.88059	1.13561	1.33245	1.51314	38
23	0.66109	0.75030	0.88110	1.13494	1.33279	1.51265	37
24	0.66131	0.75011	0.88162	1.13428	1.33314	1.51215	36
25	0.66153	0.74992	0.88214	1.13361	1.33348	1.51165	35
26	0.66175	0.74973	0.88265	1.13295	1.33382	1.51115	34
27	0.66197	0.74953	0.88317	1.13228	1.33416	1.51065	33
28	0.66218	0.74934	0.88369	1.13162	1.33451	1.51015	32
29	0.66240	0.74915	0.88421	1.13096	1.33485	1.50966	31
30	0.66262	0.74896	0.88473	1.13029	1.33519	1.50916	30
31	0.66284	0.74876	0.88524	1.12963	1.33554	1.50866	29
32	0.66306	0.74857	0.88576	1.12897	1.33588	1.50817	28
33	0.66327	0.74838	0.88628	1.12831	1.33622	1.50767	27
34	0.66349	0.74818	0.88680	1.12765	1.33657	1.50718	26
35	0.66371	0.74799	0.88732	1.12699	1.33691	1.50669	25
36	0.66393	0.74780	0.88784	1.12633	1.33726	1.50619	24
37	0.66414	0.74760	0.88837	1.12567	1.33760	1.50570	23
38	0.66436	0.74741	0.88888	1.12501	1.33795	1.50521	22
39	0.66458	0.74722	0.88940	1.12435	1.33830	1.50471	21
40	0.66480	0.74703	0.88992	1.12369	1.33864	1.50422	20
41	0.66501	0.74683	0.89045	1.12303	1.33899	1.50373	19
42	0.66523	0.74664	0.89097	1.12238	1.33934	1.50324	18
43	0.66545	0.74644	0.89149	1.12172	1.33968	1.50275	17
44	0.66566	0.74625	0.89201	1.12106	1.34003	1.50226	16
45	0.66588	0.74606	0.89253	1.12041	1.34038	1.50177	15
46	0.66610	0.74586	0.89306	1.11975	1.34073	1.50128	14
47	0.66632	0.74567	0.89358	1.11909	1.34108	1.50079	13
48	0.66653	0.74548	0.89410	1.11844	1.34142	1.50030	12
49	0.66675	0.74528	0.89463	1.11778	1.34177	1.49981	11
50	0.66697	0.74509	0.89515	1.11713	1.34212	1.49933	10
51	0.66718	0.74489	0.89567	1.11648	1.34247	1.49884	9
52	0.66740	0.74470	0.89620	1.11582	1.34282	1.49835	8
53	0.66762	0.74451	0.89672	1.11517	1.34317	1.49787	7
54	0.66783	0.74431	0.89725	1.11452	1.34352	1.49738	6
55	0.66805	0.74412	0.89777	1.11387	1.34387	1.49690	5
56	0.66827	0.74392	0.89830	1.11321	1.34423	1.49641	4
57	0.66848	0.74373	0.89883	1.11256	1.34458	1.49593	3
58	0.66870	0.74353	0.89935	1.11191	1.34493	1.49544	2
59	0.66891	0.74334	0.89988	1.11126	1.34528	1.49496	1
60	0.66913	0.74314	0.90040	1.11061	1.34563	1.49448	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

42°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.66913	0.74314	0.90040	1.11061	1.34563	1.49448	60
1	0.66935	0.74295	0.90093	1.10996	1.34599	1.49399	59
2	0.66956	0.74276	0.90146	1.10931	1.34634	1.49351	58
3	0.66978	0.74256	0.90199	1.10867	1.34669	1.49303	57
4	0.66999	0.74237	0.90251	1.10802	1.34704	1.49255	59
5	0 67021	0.74217	0.90304	1.10737	1.34740	1.49207	55
6	0.67043	0.74198	0.90357	1.10672	1.34775	1.49159	54
7	0 67064	0.74178	0.90410	1.10607	1.34811	1.49111	53
8	0.67086	0.74159	0.90463	1.10543	1.34846	1.49063	52
9	0.67107	0.74139	0.90516	1.10478	1.34882	1.49015	51
10	0.67129	0.74120	0.90569	1.10414	1.34917	1 48967	50
11	0.67151	0.74100	0 90621	1.10349	1.34953	1.48919	49
12	0.67172	0.74080	0.90674	1.10285	1.34988	1.48871	48
13	0.67194	0.74061	0.90727	1.10220	1.35024	1.48824	47
14	0.67215	0.74041	0.90781	1.10156	1.35060	1.48776	46
15	0.67237	0.74022	0.90834	1.10091	1.35095	1.48728	45
16	0.67258	0.74002	0.90887	1.10027	1.35131	1.48681	44
17	0.67280	0.73983	0.90940	1.09963	1.35167	1.48633	43
18	0.67301	0.73963	0.90993	1.09899	1.35203	1.48586	42
19	0.67323	0.73944	0.91046	1.09834	1.35238	1.48538	41
20	0.67344	0.73924	0.91099	1.09770	1.35274	1.48491	40
21	0 67366	0.73904	0.91153	1.09706	1.35310	1.48443	39
22	0.67387	0.73885	0.91206	1.09642	1.35346	1.48396	38
23	0.67409	0.73865	0.91259	1.09578	1.35382	1.48349	37
24	0.67430	0.73846	0.91313	1.09514	1.35418	1.48301	36
25	0.67452	0 73826	0.91366	1.09450	1.35454	1.48254	35
26	0.67473	0.73806	0.91419	1.09386	1.35490	1.48207	34
27	0.67495	0.73787	0.91473	1.09322	1.35526	1.48160	33
28	0.67516	0.73767	0 91526	1.09258	1.35562	1.48113	32
29	0 67538	0.73747	0.91580	1.09195	1.35598	1.48066	31
30	0.67559	0.73728	0.91633	1.09131	1.35634	1.48019	30
31	0.67580	0.73708	0.91687	1.09067	1.35670	1.47972	29
32	0.67602	0.73688	0.91740	1.09003	1.35707	1 47925	28
33	0.67623	0.73669	0.91794	1.08940	1.35743	1.47878	27
34	0.67645	0.73649	0.91847	1.08876	1.35779	1.47831	26
35	0.67666	0.73629	0.91901	1.08813	1.35815	1.47784	25
36	0.67688	0.73610	0.91955	1.08749	1.35852	1.47738	24
37	0.67709	0.73590	0.92008	1.08686	1.35888	1.47691	23
38	0.67730	0.73570	0.92062	1.08622	1.35924	1.47644	22
39	0.67752	0.73551	0.92116	1.08559	1.35961	1.47598	21
40	0.67773	0.73531	0.92170	1.08496	1.35997	1.47551	20
41	0.67795	0.73511	0.92223	1.08432	1.36034	1.47504	19
42	0.67816	0.73491	0.92277	1.08369	1.36070	1.47458	18
43	0.67837	0.73472	0.92331	1.08306	1.36107	1.47411	17
44	0.67859	0.73452	0.92385	1.08243	1.36143	1.47365	16
45	0.67880	0.73432	0.92439	1.08179	1.36180	1.47319	15
46	0.67901	0.73413	0.92493	1.08116	1.36217	1.47272	14
47	0.67923	0.73393	0.92547	1.08053	1.36253	1.47226	13
48	0.67944	0.73373	0.92601	1 07990	1.36290	1.47180	12
49	0.67965	0.73353	0.92655	1.07927	1.36327	1.47134	11
50	0.67987	0.73333	0.92709	1.07864	1.36363	1.47087	10
51	0.68008	0.73314	0.92763	1.07801	1.36400	1.47041	9
52	0.68029	0.73294	0.92817	1.07738	1.36437	1.46995	8
53	0.68051	0.73274	0.92872	1.07676	1.36474	1.46949	7
54	0.68072	0.73254	0.92926	1.07613	1.36511	1.46903	6
55	0.68093	0.73234	0.92980	1.07550	1.36548	1.46857	5
56	0.68115	0.73215	0.93034	1.07487	1.36585	1.46811	4
57	0.68136	0.73195	0.93088	1.07425	1.36622	1.46765	3
58	0.68157	0.73175	0 93143	1.07362	1.36659	1.46719	2
59	0.68179	0.73155	0.93197	1.07299	1.36696	1.46674	1
60	0.68200	0.73135	0.93252	1.07237	1.36733	1.46628	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

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43°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.68200	0.73135	0.93252	1.07237	1.36733	1.46628	60
1	0.68221	0.73116	0.93306	1.07174	1.36770	1.46582	59
2	0.68242	0.73096	0.93360	1.07112	1.36807	1.46537	58
3	0.68264	0.73076	0.93415	1.07049	1.36844	1.46491	57
4	0.68285	0.73056	0.93469	1.06987	1.36881	1.46445	56
5	0.68306	0.73036	0.93524	1.06925	1.36919	1.46400	55
6	0.68327	0.73016	0.93578	1.06862	1.36956	1.46354	54
7	0.68349	0.72996	0.93633	1.06800	1.36993	1.46309	53
8	0.68370	0.72976	0.93688	1.06738	1.37030	1.46263	52
9	0.68391	0.72957	0.93742	1.06676	1.37068	1.46218	51
10	0.68412	0.72937	0.93797	1.06613	1.37105	1.46173	50
11	0.68434	0.72917	0.93852	1.06551	1.37143	1.46127	49
12	0.68455	0.72897	0.93906	1.06489	1.37180	1.46082	48
13	0.68476	0.72877	0.93961	1.06427	1.37218	1.46037	47
14	0.68497	0.72857	0.94016	1.06365	1.37255	1.45992	46
15	0.68518	0.72837	0.94071	1.06303	1.37293	1.45946	45
16	0.68539	0.72817	0.94125	1.06241	1.37330	1.45901	44
17	0.68561	0.72797	0.94180	1.06179	1.37368	1.45856	43
18	0.68582	0.72777	0.94235	1.06117	1.37406	1.45811	42
19	0.68603	0.72757	0.94290	1.06056	1.37443	1.45766	41
20	0.68624	0.72737	0.94345	1.05994	1.37481	1.45721	40
21	0.68645	0.72717	0.94400	1.05932	1.37519	1.45676	39
22	0.68666	0.72697	0.94455	1.05870	1.37556	1.45631	38
23	0.68688	0.72677	0.94510	1.05809	1.37594	1.45587	37
24	0.68709	0.72657	0.94565	1.05747	1.37632	1.45542	36
25	0.68730	0.72637	0.94620	1.05685	1.37670	1.45497	35
26	0.68751	0.72617	0.94676	1.05624	1.37708	1.45452	34
27	0.68772	0.72597	0.94731	1.05562	1.37746	1.45408	33
28	0.68793	0.72577	0.94786	1.05501	1.37784	1.45363	32
29	0.68814	0.72557	0.94841	1.05439	1.37822	1.45319	31
30	0.68835	0.72537	0.94896	1.05378	1.37860	1.45274	30
31	0.68857	0.72517	0.94952	1.05317	1.37898	1.45229	29
32	0.68878	0.72497	0.95007	1.05255	1.37936	1.45185	28
33	0.68899	0.72477	0.95062	1.05194	1.37974	1.45141	27
34	0.68920	0.72457	0.95118	1.05133	1.38012	1.45096	26
35	0.68941	0.72437	0.95173	1.05072	1.38051	1.45052	25
36	0.68962	0.72417	0.95229	1.05010	1.38089	1.45007	24
37	0.68983	0.72397	0.95284	1.04949	1.38127	1.44963	23
38	0.69004	0.72377	0.95340	1.04888	1.38165	1.44919	22
39	0.69025	0.72357	0.95395	1.04827	1.38204	1.44875	21
40	0.69046	0.72337	0.95451	1.04766	1.38242	1.44831	20
41	0.69067	0.72317	0.95506	1.04705	1.38280	1.44787	19
42	0.69088	0.72297	0.95562	1.04644	1.38319	1.44742	18
43	0.69109	0.72277	0.95618	1.04583	1.38357	1.44698	17
44	0.69130	0.72257	0.95673	1.04522	1.38396	1.44654	16
45	0.69151	0.72236	0.95729	1.04461	1.38434	1.44610	15
46	0.69172	0.72216	0.95785	1.04401	1.38473	1.44567	14
47	0.69193	0.72196	0.95841	1.04340	1.38512	1.44523	13
48	0.69214	0.72176	0.95897	1.04279	1.38550	1.44479	12
49	0.69235	0.72156	0.95952	1.04218	1.38589	1.44435	11
50	0.69256	0.72136	0.96008	1.04158	1.38628	1.44391	10
51	0.69277	0.72116	0.96064	1.04097	1.38666	1.44347	9
52	0.69298	0.72095	0.96120	1.04036	1.38705	1.44304	8
53	0.69319	0.72075	0.96176	1.03976	1.38744	1.44260	7
54	0.69340	0.72055	0.96232	1.03915	1.38783	1.44217	6
55	0.69361	0.72035	0.96288	1.03855	1.38822	1.44173	5
56	0.69382	0.72015	0.96344	1.03794	1.38860	1.44129	4
57	0.69403	0.71995	0.96400	1.03734	1.38899	1.44086	3
58	0.69424	0.71974	0.96457	1.03674	1.38938	1.44042	2
59	0.69445	0.71954	0.96513	1.03613	1.38977	1.43999	1
60	0.69466	0.71934	0.96569	1.03553	1.39016	1.43956	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

46°

44°

′	Sin.	Cosin.	Tang.	Cotg.	Sec.	Cosec.	′
0	0.69466	0.71934	0.96569	1.03553	1.39016	1.43956	60
1	0.69487	0.71914	0.96625	1.03493	1.39055	1.43912	59
2	0.69508	0.71894	0.96681	1.03433	1.39095	1.43869	58
3	0.69529	0.71873	0.96738	1.03372	1.39134	1.43826	57
4	0.69549	0.71853	0.96794	1.03312	1.39173	1.43783	56
5	0.69570	0.71833	0.96850	1.03252	1.39212	1.43739	55
6	0.69591	0.71813	0.96907	1.03192	1.39251	1.43696	54
7	0.69612	0.71792	0.96963	1.03132	1.39291	1.43653	53
8	0.69633	0.71772	0.97020	1.03072	1.39330	1.43610	52
9	0.69654	0.71752	0.97076	1.03012	1.39369	1.43567	51
10	0.69675	0.71732	0.97133	1.02952	1.39409	1.43524	50
11	0.69696	0.71711	0.97189	1.02892	1.39448	1.43481	49
12	0.69717	0.71691	0.97246	1.02832	1.39487	1.43438	48
13	0.69737	0.71671	0.97302	1.02772	1.39527	1.43395	47
14	0.69758	0.71650	0.97359	1.02713	1.39566	1.43352	46
15	0.69779	0.71630	0.97416	1.02653	1.39606	1.43309	45
16	0.69800	0.71610	0.97472	1.02593	1.39646	1.43267	44
17	0.69821	0.71590	0.97529	1.02533	1.39685	1.43224	43
18	0.69842	0.71569	0.97586	1.02474	1.39725	1.43181	42
19	0.69862	0.71549	0.97643	1.02414	1.39764	1.43139	41
20	0.69883	0.71529	0.97700	1.02355	1.39804	1.43096	40
21	0.69904	0.71508	0.97756	1.02295	1.39844	1.43053	39
22	0.69925	0.71488	0.97813	1.02236	1.39884	1.43011	38
23	0.69946	0.71468	0.97870	1.02176	1.39924	1.42968	37
24	0.69966	0.71447	0.97927	1.02117	1.39963	1.42926	36
25	0.69987	0.71427	0.97984	1.02057	1.40003	1.42883	35
26	0.70008	0.71407	0.98041	1.01998	1.40043	1.42841	34
27	0.70029	0.71386	0.98098	1.01939	1.40083	1.42799	33
28	0.70049	0.71366	0.98155	1.01879	1.40123	1.42756	32
29	0.70070	0.71345	0.98213	1.01820	1.40163	1.42714	31
30	0.70091	0.71325	0.98270	1.01761	1.40203	1.42672	30
31	0.70112	0.71305	0.98327	1.01702	1.40243	1.42630	29
32	0.70132	0.71284	0.98384	1.01642	1.40283	1.42587	28
33	0.70153	0.71264	0.98441	1.01583	1.40324	1.42545	27
34	0.70174	0.71243	0.98499	1.01524	1.40364	1.42503	26
35	0.70195	0.71223	0.98556	1.01465	1.40404	1.42461	25
36	0.70215	0.71203	0.98613	1.01406	1.40444	1.42419	24
37	0.70236	0.71182	0.98671	1.01347	1.40485	1.42377	23
38	0.70257	0.71162	0.98728	1.01288	1.40525	1.42335	22
39	0.70277	0.71141	0.98786	1.01229	1.40565	1.42293	21
40	0.70298	0.71121	0.98843	1.01170	1.40606	1.42251	20
41	0.70319	0.71100	0.98901	1.01112	1.40646	1.42210	19
42	0.70339	0.71080	0.98958	1.01053	1.40687	1.42168	18
43	0.70360	0.71059	0.99016	1.00994	1.40727	1.42126	17
44	0.70381	0.71039	0.99073	1.00935	1.40768	1.42084	16
45	0.70401	0.71019	0.99131	1.00876	1.40808	1.42042	15
46	0.70422	0.70998	0.99189	1.00818	1.40849	1.42001	14
47	0.70443	0.70978	0.99247	1.00759	1.40890	1.41959	13
48	0.70463	0.70957	0.99304	1.00701	1.40930	1.41918	12
49	0.70484	0.70937	0.99362	1.00642	1.40971	1.41876	11
50	0.70505	0.70916	0.99420	1.00583	1.41012	1.41835	10
51	0.70525	0.70896	0.99478	1.00525	1.41053	1.41793	9
52	0.70546	0.70875	0.99536	1.00467	1.41093	1.41752	8
53	0.70567	0.70855	0.99594	1.00408	1.41134	1.41710	7
54	0.70587	0.70834	0.99652	1.00350	1.41175	1.41669	6
55	0.70608	0.70813	0.99710	1.00291	1.41216	1.41627	5
56	0.70628	0.70793	0.99768	1.00233	1.41257	1.41586	4
57	0.70649	0.70772	0.99826	1.00175	1.41298	1.41545	3
58	0.70670	0.70752	0.99884	1.00116	1.41339	1.41504	2
59	0.70690	0.70731	0.99942	1.00058	1.41380	1.41463	1
60	0.70711	0.70711	1.00000	1.00000	1.41421	1.41421	0
′	Cosin.	Sin.	Cotg.	Tang.	Cosec.	Sec.	′

N.	N^2	N.	N^2	N.	N^2
1	1	34	1156	67	4489
2	4	35	1225	68	4624
3	9	36	1296	69	4761
4	16	37	1369	70	4900
5	25	38	1444	71	5041
6	36	39	1521	72	5184
7	49	40	1600	73	5329
8	64	41	1681	74	5476
9	81	42	1764	75	5625
10	100	43	1849	76	5776
11	121	44	1936	77	5929
12	144	45	2025	78	6084
13	169	46	2116	79	6241
14	196	47	2209	80	6400
15	225	48	2304	81	6561
16	256	49	2401	82	6724
17	289	50	2500	83	6889
18	324	51	2601	84	7056
19	361	52	2704	85	7225
20	400	53	2809	86	7396
21	441	54	2916	87	7569
22	484	55	3025	88	7744
23	529	56	3136	89	7921
24	576	57	3249	90	8100
25	625	58	3364	91	8281
26	676	59	3481	92	8464
27	729	60	3600	93	8649
28	784	61	3721	94	8836
29	841	62	3844	95	9025
30	900	63	3969	96	9216
31	961	64	4096	97	9409
32	1024	65	4225	98	9604
33	1089	66	4356	99	9801

N.	N² 0	1	2	3	4	5	6	7	8	9
100	10 0000	0200	0400	0600	0801	1002	1203	1404	1606	1808
101	2010	2212	2414	2616	2819	3022	3225	3428	3632	3836
102	4040	4244	4448	4652	4857	5062	5267	5472	5678	5884
103	6090	6296	6502	6708	6915	7122	7329	7536	7744	7952
104	8160	8368	8576	8784	8993	9202	9411	9620	9830*	0040
105	11 0250	0460	0670	0880	1091	1302	1513	1724	1936	2148
106	2360	2572	2784	2996	3209	3422	3635	3848	4062	4276
107	4490	4704	4918	5132	5347	5562	5777	5992	6208	6424
108	6640	6856	7072	7288	7505	7722	7939	8156	8374	8592
109	8810	9028	9246	9464	9683	9902*	0121*	0340*	0560*	0780
110	12 1000	1220	1440	1660	1881	2102	2323	2544	2766	2988
111	3210	3432	3654	3876	4099	4322	4545	4768	4992	5216
112	5440	5664	5888	6112	6337	6562	6787	7012	7238	7464
113	7690	7916	8142	8368	8595	8822	9049	9276	9504	9732
114	9960*	0188*	0416*	0644*	0873	*1102*	1331*	1560*	1790*	2020
115	13 2250	2480	2710	2940	3171	3402	3633	3864	4096	4328
116	4560	4792	5024	5256	5489	5722	5955	6188	6422	6656
117	6890	7124	7358	7592	7827	8062	8297	8532	8768	9004
118	9240	9476	9712	9948*	0185	*0422*	0659*	0896*	1134*	1372
119	14 1610	1848	2086	2324	2563	2802	3041	3280	3520	3760
120	4000	4240	4480	4720	4961	5202	5443	5684	5926	6168
121	9410	6652	6894	7136	7379	7622	7865	8108	8352	8596
122	8840	9084	9328	9572	9817	*0062*	0307*	0552*	0798*	1044
123	15 1290	1536	1782	2028	2275	2522	2769	3016	3264	3512
124	3760	4008	4256	4504	4753	5002	5251	5500	5750	6000
125	6250	6500	6750	7000	7251	7502	7753	8004	8256	8508
126	8760	9012	9264	9516	9769	*0022*	0275*	0528*	0782*	1036
127	16 1290	1544	1798	2052	2307	2562	2817	3072	3328	3584
128	3840	4096	4352	4608	4865	5122	5379	5636	5894	6152
129	6410	6668	6926	7184	7443	7702	7961	8220	8480	8740
130	9000	9260	9520	9780*	0041	*0302*	0563*	0824*	1086*	1348
131	17 1610	1872	2134	2396	2659	2922	3185	3448	3712	3976
132	4240	4504	4768	5032	5297	5562	5827	6092	6358	6624
133	6890	7156	7422	7688	7955	8222	8489	8756	9024	9292
134	9560	9828*	0096*	0364*	0633	*0902*	1171*	1440*	1710*	1980
135	18 2250	2520	2790	3060	3331	3602	3873	4144	4416	4688
136	4960	5232	5504	5776	6049	6322	6595	6868	7142	7416
137	7690	7964	8238	8512	8787	9062	9337	9612	9888*	0164
138	19 0440	0716	0992	1268	1545	1822	2099	2376	2654	2932
139	3210	3488	3766	4044	4323	4602	4881	5160	5440	5720
140	6000	6280	6560	6840	7121	7402	7683	7964	8246	8528
141	8810	9092	9374	9656	9939	*0222*	0505*	0788*	1072*	1356
142	20 1640	1924	2208	2492	2777	3062	3347	3632	3918	4204
143	4490	4776	5062	5348	5635	5922	6209	6496	6784	7072
144	7360	7648	7936	8224	8513	8802	9091	9380	9670	9960
145	21 0250	0540	0830	1120	1411	1702	1993	2284	2576	2868
146	3160	3452	3744	4036	4329	4622	4915	5208	5502	5796
147	6090	6384	6678	6972	7267	7562	7857	8152	8448	8744
148	9040	9336	9632	9928*	0225	*0522*	0819*	1116*	1414*	1712
149	22 2010	2308	2606	2904	3203	3502	3801	4100	4400	4700
150	5000	5300	5600	5900	6201	6502	6803	7104	7406	7708
L.Z.	0	1	4	9	6	5	6	9	4	1

N.	N² 0	1	2	3	4	5	6	7	8	9
150	22 5000	5300	5600	5900	6201	6502	6803	7104	7406	7708
151	8010	8312	8614	8916	9219	9522	9825*	0128*	0432*	0736
152	23 1040	1344	1648	1952	2257	2562	2867	3172	3478	3784
153	4090	4396	4702	5008	5315	5622	5929	6236	6544	6852
154	7160	7468	7776	8084	8393	8702	9011	9320	9630	9940
155	24 0250	0560	0870	1180	1491	1802	2113	2424	2736	3048
156	3360	3672	3984	4296	4609	4922	5235	5548	5862	6176
157	6490	6804	7118	7432	7747	8062	8377	8692	9008	9324
158	9640	9956*	0272*	0588*	0905	*1222*	1539*	1856*	2174*	2492
159	25 2810	3128	3446	3764	4083	4402	4721	5040	5360	5680
160	6000	6320	6640	6960	7281	7602	7923	8244	8566	8888
161	9210	9532	9854*	0176*	0499	*0822*	1145*	1468*	1792*	2116
162	26 2440	2764	3088	3412	3737	4062	4387	4712	5038	5364
163	5690	6016	6342	6668	6995	7322	7649	7976	8304	8632
164	8960	9288	9616	9944*	0273	*0602*	0931*	1260*	1590*	1920
165	27 2250	2580	2910	3240	3571	3902	4233	4564	4896	5228
166	5560	5892	6224	6556	6889	7222	7555	7888	8222	8556
167	8890	9224	9558	9892*	0227	*0562*	0897*	1232*	1568*	1904
168	28 2240	2576	2912	3248	3585	3922	4259	4596	4934	5272
169	5610	5948	6286	6624	6963	7302	7641	7980	8320	8660
170	9000	9340	9680*	0020*	0361	*0702*	1043*	1384*	1726*	2068
171	29 2410	2752	3094	3436	3779	4122	4465	4808	5152	5496
172	5840	6184	6528	6872	7217	7562	7907	8252	8598	8944
173	9290	9636	9982*	0328*	0675	*1022*	1369*	1716*	2064*	2412
174	30 2760	3108	3456	3804	4153	4502	4851	5200	5550	5900
175	6250	6600	6950	7300	7651	8002	8353	8704	9056	9408
176	9760*	0112*	0464*	0816*	1169	*1522*	1875*	2228*	2582*	2936
177	31 3290	3644	3998	4352	4707	5062	5417	5772	6128	6484
178	6840	7196	7552	7908	8265	8622	8979	9336	9694*	0052
179	32 0410	0768	1126	1484	1843	2202	2561	2920	3280	3640
180	4000	4360	4720	5080	5441	5802	6163	6524	6886	7248
181	7610	7972	8334	8696	9059	9422	9785*	0148*	0512*	0876
182	33 1240	1604	1968	2332	2697	3062	3427	3792	4158	4524
183	4890	5256	5622	5988	6355	6722	7089	7456	7824	8192
184	8560	8928	9296	9664*	0033	*0402*	0771*	1140*	1510*	1880
185	34 2250	2620	2990	3360	3731	4102	4473	4844	5216	5588
186	5960	6332	6704	7076	7449	7822	8195	8568	8942	9316
187	9690*	0064*	0438*	0812*	1187	*1562*	1937*	2312*	2688*	3064
188	35 3440	3816	4192	4568	4945	5322	5699	6076	6454	6832
189	7210	7588	7966	8344	8723	9102	9481	9860*	0240*	0620
190	36 1000	1380	1760	2140	2521	2902	3283	3664	4046	4428
191	4810	5192	5574	5956	6339	6722	7105	7488	7872	8256
192	8640	9024	9408	9792*	0177	*0562*	0947*	1332*	1718*	2104
193	37 2490	2876	3262	3648	4035	4422	4809	5196	5584	5972
194	6360	6748	7136	7524	7913	8302	8691	9080	9470	9860
195	38 0250	0640	1030	1420	1811	2202	2593	2984	3376	3768
196	4160	4552	4944	5336	5729	6122	6515	6908	7302	7696
197	8090	8484	8878	9272	9667	*0062*	0457*	0852*	1248*	1644
198	39 2040	2436	2832	3228	3625	4022	4419	4816	5214	5612
199	6010	6408	6806	7204	7603	8002	8401	8800	9200	9600
200	40 0000	0400	0800	1200	1601	2002	2403	2804	3206	3608
L.Z.	0	1	4	9	6	5	6	9	4	1

N.	N² 0	1	2	3	4	5	6	7	8	9
200	4 00000	00400	00800	01200	01601	02002	02403	02804	03206	03608
201	04010	04412	04814	05216	05619	06022	06425	06828	07232	07636
202	08040	08444	08848	09252	09657	10062	10467	10872	11278	11684
203	12090	12496	12902	13308	13715	14122	14529	14936	15344	15752
204	16160	16568	16976	17384	17793	18202	18611	19020	19430	19840
205	20250	20660	21070	21480	21891	22302	22713	23124	23536	23948
206	24360	24772	25184	25596	26009	26422	26835	27248	27662	28076
207	28490	28904	29318	29732	30147	30562	30977	31392	31808	32224
208	32640	33056	33472	33888	34305	34722	35139	35556	35974	36392
209	36810	37228	37646	38064	38483	38902	39321	39740	40160	40580
210	41000	41420	41840	42260	42681	43102	43523	43944	44366	44788
211	45210	45632	46054	46476	46899	47322	47745	48168	48592	49016
212	49440	49864	50288	50712	51137	51562	51987	52412	52838	53264
213	53690	54116	54542	54968	55395	55822	56249	56676	57104	57532
214	57960	58388	58816	59244	59673	60102	60531	60960	61390	61820
215	62250	62680	63110	63540	63971	64402	64833	65264	65696	66128
216	66560	66992	67424	67856	68289	68722	69155	69588	70022	70456
217	70890	71324	71758	72192	72627	73062	73497	73932	74368	74804
218	75240	75676	76112	76548	76985	77422	77859	78296	78734	79172
219	79610	80048	80486	80924	81363	81802	82241	82680	83120	83560
220	84000	84440	84880	85320	85761	86202	86643	87084	87526	87968
221	88410	88852	89294	89736	90179	90622	91065	91508	91952	92396
222	92840	93284	93728	94172	94617	95062	95507	95952	96398	96844
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668		62240	63576	64912	66248	67585	68922	70259	71596	72934	74272
669		75610	76948	78286	79624	80963	82302	83641	84980	86320	87660
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672		15840	17184	18528	19872	21217	22562	23907	25252	26598	27944
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675		56250	57600	58950	60300	61651	63002	64353	65704	67056	68408
676		69760	71112	72464	73816	75169	76522	77875	79228	80582	81936
677		83290	84644	85998	87352	88707	90062	91417	92772	94128	95484
678		96840	98196	99552*	00908*	02265	*03622*	04979*	06336*	07694*	09052
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683		64890	66256	67622	68988	70355	71722	73089	74456	75824	77192
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685		92250	93620	94990	96360	97731	99102*	00473*	01844*	03216*	04588
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687		19690	21064	22438	23812	25187	26562	27937	29312	30688	32064
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707		98490	99904*	01318*	02732*	04147	*05562*	06977*	08392*	09808*	11224
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721		98410	99852*	01294*	02736*	04179	*05622*	07065*	08508*	09952*	11396
722	52	12840	14284	15728	17172	18617	20062	21507	22952	24398	25844
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737		31690	33164	34638	36112	37587	39062	40537	42012	43488	44964
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757	30490	32004	33518	35032	36547	38062	39577	41092	42608	44124
758	45640	47156	48672	50188	51705	53222	54739	56256	57774	59292
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761	91210	92732	94254	95776	97299	98822*	00345*	01868*	03392*	04916
762	58 06440	07964	09488	11012	12537	14062	15587	17112	18638	20164
763	21690	23216	24742	26268	27795	29322	30849	32376	33904	35432
764	36960	38488	40016	41544	43073	44602	46131	47660	49190	50720
765	52250	53780	55310	56840	58371	59902	61433	62964	64496	66028
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769	59 13610	15148	16686	18224	19763	21302	22841	24380	25920	27460
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781	99610*	01172*	02734*	04296*	05859	*07422*	*08985*	*10548*	*12112*	*13676
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787	93690	95264	96838	98412	99987	*01562*	*03137*	*04712*	*06288*	*07864
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806		96360	97972	99584	*01196	*02809	*04422	*06035	*07648	*09262	*10876
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875	56250	58000	59750	61500	63251	65002	66753	68504	70256	72008
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880	44000	45760	47520	49280	51041	52802	54563	56324	58086	59848
881	61610	63372	65134	66896	68659	70422	72185	73948	75712	77476
882	79240	81004	82768	84532	86297	88062	89827	91592	93358	95124
883	96890	98656*	00422*	02188*	03955	*05722*	*07489*	*09256*	*11024*	*12792
884	78 14560	16328	18096	19864	21633	23402	25171	26940	28710	30480
885	32250	34020	35790	37560	39331	41102	42873	44644	46416	48188
886	49960	51732	53504	55276	57049	58822	60595	62368	64142	65916
887	67690	69464	71238	73012	74787	76562	78337	80112	81888	83664
888	85440	87216	88992	90768	92545	94322	96099	97876	99654*	01432
889	79 03210	04988	06766	08544	10323	12102	13881	15660	17440	19220
890	21000	22780	24560	26340	28121	29902	31683	33464	35246	37028
891	38810	40592	42374	44156	45939	47722	49505	51288	53072	54856
892	56640	58424	60208	61992	63777	65562	67347	69132	70918	72704
893	74490	76276	78062	79848	81635	83422	85209	86996	88784	90572
894	92360	94148	95936	97724	99513	*01302*	*03091*	*04880*	*06670*	*08460
895	80 10250	12040	13830	15620	17411	19202	20993	22784	24576	26368
896	28160	29952	31744	33536	35329	37122	38915	40708	42502	44296
897	46090	47884	49678	51472	53267	55062	56857	58652	60448	62244
898	64040	65836	67632	69428	71225	73022	74819	76616	78414	80212
899	82010	83808	85606	87404	89203	91002	92801	94600	96400	98200
900	81 00000	01800	03600	05400	07201	09002	10803	12604	14406	16208
L.Z.	0	1	4	9	6	5	6	9	4	1

N.	N² 0	1	2	3	4	5	6	7	8	9
900	81 00000	01800	03600	05400	07201	09002	10803	12604	14406	16208
901	18010	19812	21614	23416	25219	27022	28825	30628	32432	34236
902	36040	37844	39648	41452	43257	45062	46867	48672	50478	52284
903	54090	55896	57702	59508	61315	63122	64929	66736	68544	70352
904	72160	73968	75776	77584	79393	81202	83011	84820	86630	88440
905	90250	92060	93870	95680	97491	99302*01113*02924*04736*06548				
906	82 08360	10172	11984	13796	15609	17422	19235	21048	22862	24676
907	26490	28304	30118	31932	33747	35562	37377	39192	41008	42824
908	44640	46456	48272	50088	51905	53722	55539	57356	59174	60992
909	62810	64628	66446	68264	70083	71902	73721	75540	77360	79180
910	81000	82820	84640	86460	88281	90102	91923	93744	95566	97388
911	99210*01032*02854*04676*06499					*08322*10145*11968*13792*15616				
912	83 17440	19264	21088	22912	24737	26562	28387	30212	32038	33864
913	35690	37516	39342	41168	42995	44822	46649	48476	50304	52132
914	53960	55788	57616	59444	61273	63102	64931	66760	68590	70420
915	72250	74080	75910	77740	79571	81402	83233	85064	86896	88728
916	90560	92392	94224	96056	97889	99722*01555*03388*05222*07056				
917	84 08890	10724	12558	14392	16227	18062	19897	21732	23568	25404
918	27240	29076	30912	32748	34585	36422	38259	40096	41934	43772
919	45610	47448	49286	51124	52963	54802	56641	58480	60320	62160
920	64000	65840	67680	69520	71361	73202	75043	76884	78726	80568
921	82410	84252	86094	87936	89779	91622	93465	95308	97152	98996
922	85 00840	02684	04528	06372	08217	10062	11907	13752	15598	17444
923	19290	21136	22982	24828	26675	28522	30369	32216	34064	35912
924	37760	39608	41456	43304	45153	47002	48851	50700	52550	54400
925	56250	58100	59950	61800	63651	65502	67353	69204	71056	72908
926	74760	76612	78464	80316	82169	84022	85875	87728	89582	91436
927	93290	95144	96998	98852*00707		*02562*04417*06272*08128*09984				
928	86 11840	13696	15552	17408	19265	21122	22979	24836	26694	28552
929	30410	32268	34126	35984	37843	39702	41561	43420	45280	47140
930	49000	50860	52720	54580	56441	58302	60163	62024	63886	65748
931	67610	69472	71334	73196	75059	76922	78785	80648	82512	84376
932	86240	88104	89968	91832	93697	95562	97427	99292*01158*03024		
933	87 04890	06756	08622	10488	12355	14222	16089	17956	19824	21692
934	23560	25428	27296	29164	31033	32902	34771	36640	38510	40380
935	42250	44120	45990	47860	49731	51602	53473	55344	57216	59088
936	60960	62832	64704	66576	68449	70322	72195	74068	75942	77816
937	79690	81564	83438	85312	87187	89062	90937	92812	94688	96564
938	98440*00316*02192*04068*05945					*07822*09699*11576*13454*15332				
939	88 17210	19088	20966	22844	24723	26602	28481	30360	32240	34120
940	36000	37880	39760	41640	43521	45402	47283	49164	51046	52928
941	54810	56692	58574	60456	62339	64222	66105	67988	69872	71756
942	73640	75524	77408	79292	81177	83062	84947	86832	88718	90604
943	92490	94376	96262	98148*00035		*01922*03809*05696*07584*09472				
944	89 11360	13248	15136	17024	18913	20802	22691	24580	26470	28360
945	30250	32140	34030	35920	37811	39702	41593	43484	45376	47268
946	49160	51052	52944	54836	56729	58622	60515	62408	64302	66196
947	68090	69984	71878	73772	75667	77562	79457	81352	83248	85144
948	87040	88936	90832	92728	94625	96522	98419*00316*02214*04112			
949	90 06010	07908	09806	11704	13603	15502	17401	19300	21200	23100
950	25000	26900	28800	30700	32601	34502	36403	38304	40206	42108
L. Z.	0	1	4	9	6	5	6	9	4	1

N.	N²	0	1	2	3	4	5	6	7	8	9
950	90	25000	26900	28800	30700	32601	34502	36403	38304	40206	42108
951		44010	45912	47814	49716	51619	53522	55425	57328	59232	61136
952		63040	64944	66848	68752	70657	72562	74467	76372	78278	80184
953		82090	83996	85902	87808	89715	91622	93529	95436	97344	99252
954	91	01160	03068	04976	06884	08793	10702	12611	14520	16430	18340
955		20250	22160	24070	25980	27891	29802	31713	33624	35536	37448
956		39360	41272	43184	45096	47009	48922	50835	52748	54662	56576
957		58490	60404	62318	64232	66147	68062	69977	71892	73808	75724
958		77640	79556	81472	83388	85305	87222	89139	91056	92974	94892
959		96810	98728*	00646*	02564*	04483	*06402*	08321*	10240*	12160*	14080
960	92	16000	17920	19840	21760	23681	25602	27523	29444	31366	33288
961		35210	37132	39054	40976	42899	44822	46745	48668	50592	52516
962		54440	56364	58288	60212	62137	64062	65987	67912	69838	71764
963		73690	75616	77542	79468	81395	83322	85249	87176	89104	91032
964		92960	94888	96816	98744*	00673	*02602*	04531*	06460*	08390*	10320
965	93	12250	14180	16110	18040	19971	21902	23833	25764	27696	29628
966		31560	33492	35424	37356	39289	41222	43155	45088	47022	48956
967		50890	52824	54758	56692	58627	60562	62497	64432	66368	68304
968		70240	72176	74112	76048	77985	79922	81859	83796	85734	87672
969		89610	91548	93486	95424	97363	99302*	01241*	03180*	05120*	07060
970	94	09000	10940	12880	14820	16761	18702	20643	22584	24526	26468
971		28410	30352	32294	34236	36179	38122	40065	42008	43952	45896
972		47840	49784	51728	53672	55617	57562	59507	61452	63398	65344
973		67290	69236	71182	73128	75075	77022	78969	80916	82864	84812
974		86760	88708	90656	92604	94553	96502	98451*	00400*	02350*	04300
975	95	06250	08200	10150	12100	14051	16002	17953	19904	21856	23808
976		25760	27712	29664	31616	33569	35522	37475	39428	41382	43336
977		45290	47244	49198	51152	53107	55062	57017	58972	60928	62884
978		64840	66796	68752	70708	72665	74622	76579	78536	80494	82452
979		84410	86368	88326	90284	92243	94202	96161	98120*	00080*	02040
980	96	04000	05960	07920	09880	11841	13802	15763	17724	19686	21648
981		23610	25572	27534	29496	31459	33422	35385	37348	39312	41276
982		43240	45204	47168	49132	51097	53062	55027	56992	58958	60924
983		62890	64856	66822	68788	70755	72722	74689	76656	78624	80592
984		82560	84528	86496	88464	90433	92402	94371	96340	98310*	00280
985	97	02250	04220	06190	08160	10131	12102	14073	16044	18016	19988
986		21960	23932	25904	27876	29849	31822	33795	35768	37742	39716
987		41690	43664	45638	47612	49587	51562	53537	55512	57488	59464
988		61440	63416	65392	67368	69345	71322	73299	75276	77254	79232
989		81210	83188	85166	87144	89123	91102	93081	95060	97040	99020
990	98	01000	02980	04960	06940	08921	10902	12883	14864	16846	18828
991		20810	22792	24774	26756	28739	30722	32705	34688	36672	38656
992		40640	42624	44608	46592	48577	50562	52547	54532	56518	58504
993		60490	62476	64462	66448	68435	70422	72409	74396	76384	78372
994		80360	82348	84336	86324	88313	90302	92291	94280	96270	98260
995	99	00250	02240	04230	06220	08211	10202	12193	14184	16176	18168
996		20160	22152	24144	26136	28129	30122	32115	34108	36102	38096
997		40090	42084	44078	46072	48067	50062	52057	54052	56048	58044
998		60040	62036	64032	66028	68025	70022	72019	74016	76014	78012
999		80010	82008	84006	86004	88003	90002	92001	94000	96000	98000
1000	100	00000	02000	04000	06000	08001	10002	12003	14004	16006	18008
L.Z.		0	1	4	9	6	5	6	9	4	1

Tafel I.

Argument: $(t + t' = 2c)$.

		Diff.			Diff.			Diff.
—25	4.24508	83	3	4.26788	80	31	4.28956	76
—24	4.24591	83	4	4.26868	79	32	4.29032	75
—23	4.24674	84	5	4.26947	78	33	4.29107	75
—22	4.24758	83	6	4.27025	79	34	4.29182	75
—21	4.24841	83	7	4.27104	79	35	4.29257	75
—20	4.24924	82	8	4.27183	79	36	4.29332	75
—19	4.25006	83	9	4.27262	78	37	4.29407	75
—18	4.25089	83	10	4.27340	78	38	4.29482	74
—17	4.25172	82	11	4.27418	79	39	4.29556	75
—16	4.25254	82	12	4.27497	79	40	4.29631	74
—15	4.25336	82	13	4.27576	78	41	4.29705	74
—14	4.25418	82	14	4.27654	77	42	4.29779	74
—13	4.25500	81	15	4.27731	78	43	4.29853	74
—12	4.25581	82	16	4.27809	77	44	4.29927	74
—11	4.25663	81	17	4.27886	78	45	4.30001	74
—10	4.25744	81	18	4.27964	77	46	4.30075	73
— 9	4.25825	81	19	4.28041	77	47	4.30148	73
— 8	4.25906	81	20	4.28118	77	48	4.30221	74
— 7	4.25987	81	21	4.28195	76	49	4.30295	73
— 6	4.26068	81	22	4.28271	77	50	4.30368	73
— 5	4.26149	80	23	4.28348	77	51	4.30441	73
— 4	4.26229	80	24	4.28425	76	52	4.30514	73
— 3	4.26309	81	25	4.28501	76	53	4.30587	72
— 2	4.26390	80	26	4.28577	76	54	4.30659	73
— 1	4.26470	80	27	4.28653	76	55	4.30732	72
0	4.26550	79	28	4.28729	76	56	4.30804	73
1	4.26629	80	29	4.28805	76	57	4.30877	72
2	4.26709	79	30	4.28881	75	58	4.30949	72
3	4.26788		31	4.28956		59	4.31021	72
						60	4.31093	

Tafel II.

Argument: $x = 45° - \varphi$.

Je nachdem $x \gtrless o$, hat man das Zeichen $\pm$ anzuwenden.

x		x	
0	0.00000	23	0.00082
1	4	24	85
2	8	25	87
3	12	26	90
4	16	27	92
5	20	28	95
6	24	29	97
7	28	30	0.00099
8	31	31	101
9	35	32	103
10	0.00039	33	104
11	43	34	106
12	46	35	107
13	50	36	109
14	54	37	110
15	57	38	111
16	60	39	112
17	64	40	0.00112
18	67	41	113
19	70	42	114
20	0.00073	43	114
21	76	44	114
22	79	45	114

Tafel III.

Argumente: *log. h* und *z*.

log. h	z														
	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	4000
1.0	0 0000	1	2	4	5	7	8	9	11	12	13	20	27	41	54
2.0	1	2	3	5	6	8	9	10	12	13	14	21	28	42	55
2.1	1	2	3	5	6	8	9	10	12	13	14	21	28	42	55
2.2	1	2	3	5	6	8	9	10	12	13	14	21	28	42	55
2.3	1	2	3	5	6	8	9	10	12	13	14	21	28	42	55
2.4	2	3	4	6	7	9	10	11	13	14	15	22	29	43	56
2.5	2	3	4	6	7	9	10	11	13	14	15	22	29	43	56
2.6	3	4	5	7	8	10	11	12	14	15	16	23	30	44	57
2.7	3	4	5	7	8	10	11	12	14	15	16	23	30	44	57
2.8	4	5	6	8	9	11	12	13	15	16	17	24	31	45	58
2.9	5	6	7	9	10	12	13	14	16	17	18	25	32	46	59
3.0	7	8	9	11	12	14	15	16	18	19	20	27	34	48	61
3.1	9	10	11	13	14	16	17	18	20	21	22	29	36	50	63
3.2	11	11	13	15	16	18	19	20	22	23	24	31	38	52	65
3.3	14	15	16	18	19	21	22	23	25	27	27	34	41	55	68
3.4	17	18	19	21	22	24	25	26	28	29	30	37	44	58	71
3.5	22	23	24	26	27	29	30	31	38	34	35	42	49	63	76
3.6	27	28	29	31	32	38	35	36	38	39	40	47	54	68	81
3.7	34	35	36	38	39	41	42	43	45	46	47	54	61	75	88
3.8	45	43	45	47	48	50	51	52	54	55	56	63	70	84	97

Tafel IV. 1.

Temperatur	0.0	0.2	0.4	0.6	0.8
—14.0	1.51	1.49	1.47	1.44	1.42
—13.0	1.64	1.62	1.59	1.57	1.54
—12.0	1.78	1.75	1.73	1.70	1.67
—11.0	1.93	1.90	1.87	1.84	1.81
—10.0	2.09	2.06	2.03	2.00	1.97
— 9.0	2.27	2.24	2.20	2.16	2.13
— 8.0	2.46	2.42	2.38	2.35	2.31
— 7.0	2.67	2.63	2.58	2.54	2.50
— 6.0	2.89	2.84	2.80	2.75	2.71
— 5.0	3.12	3.08	3.03	2.98	2.93
— 4.0	3.37	3.32	3.27	3.22	3.17
— 3.0	3.64	3.59	3.53	3.48	3.43
— 2.0	3.93	3.87	3.81	3.75	3.70
— 1.0	4.24	4.17	4.11	4.05	3.99
0.0	4.56	4.50	4.43	4.36	4.30
	4.56	4.63	4.70	4.76	4.83
1.0	4.90	4.97	5.05	5.12	5.19
2.0	5.27	5.34	5.42	5.50	5.57
3.0	5.65	5.73	5.81	5.90	5.98
4.0	6.06	6.15	6.24	6.32	6.41
5.0	6.50	6.59	6.68	6.78	6.87
6.0	6.97	7.07	7.16	7.26	7.36
7.0	7.46	7.57	7.67	7.77	7.88
8.0	7.99	8.10	8.21	8.32	8.43
9.0	8.55	8.67	8.78	8.90	9.02
10.0	9.15	9.27	9.39	9.52	9.64
11.0	9.77	9.90	10.03	10.17	10.30
12.0	10.44	10.58	10.72	10.86	11.00
13.0	11.15	11.29	11.44	11.59	11.74
14.0	11.90	12.05	12.21	12.37	12.53
15.0	12.69	12.85	13.02	13.19	13.76
16.0	13.53	13.70	13.88	14.05	14.23
17.0	14.42	14.60	14.78	14.97	15.16
18.0	15.35	15.55	15.74	15.94	16.14
19.0	16.35	16.55	16.76	16.97	17.18
20.0	17.39	17.61	17.83	18.05	18.27
21.0	18.50	18.73	18.96	19.19	19.43
22.0	19.66	19.91	20.15	20.70	20.65
23.0	20.90	21.15	21.41	21.67	21.93
24.0	22.20	22.46	22.74	23.01	23.29
25.0	23.57	23.85	24.13	24.42	24.71
26.0	25.01	25.30	25.60	25.91	26.22
27.0	26.53	26.84	27.15	27.47	27.80
28.0	28.12	28.46	28.78	29.13	29.47
29.0	29.81	20.15	30.50	30.86	31.21
30.0	31.58	31.94	32.31	32.68	33.05

Tafel IV. 2.

B.	$t-t'$ 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	Wenn das feuchte Thermometer mit Eis bedeckt ist. $t-t'$ 1.	2.	3.
400	0.32	0.64	0.96	1.28	1.60	1.92	2.24	2.56	2.88	3.20	0.28	0.55	0.83
420	0.34	0.69	1.02	1.34	1.68	2.02	2.35	2.69	3.02	3.36	0.29	0.58	0.87
440	0.35	0.70	1.06	1.41	1.76	2.11	2.46	2.82	3.17	3.52	0.30	0.60	0.91
460	0.37	0.74	1.10	1.47	1.84	2.21	2.57	2.94	3.31	3.68	0.32	0.63	0.95
480	0.38	0.77	1.15	1.53	1.92	2.30	2.69	3.07	3.46	3.84	0.33	0.66	0.99
500	0.40	0.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60	4.00	0.35	0.69	1.04
520	0.42	0.84	1.25	1.66	2.08	2.50	2.93	3.33	3.74	4.16	0.36	0.72	1.08
540	0.43	0.87	1.30	1.73	2.16	2.59	3.05	3.46	3.89	4.32	0.37	0.75	1.12
560	0.45	0.90	1.34	1.79	2.23	2.69	3.14	3.58	4.03	4.48	0.39	0.77	1.16
580	0.46	0.93	1.39	1.86	2.32	2.78	3.25	3.71	4.18	4.64	0.40	0.80	1.20
600	0.48	0.96	1.44	1.92	2.40	2.88	3.36	3.84	4.32	4.80	0.41	0.83	1.24
620	0.50	0.99	1.49	1.98	2.48	2.98	3.47	3.97	4.46	4.96	0.43	0.86	1.28
640	0.51	1.02	1.54	2.05	2.56	3.07	3.58	4.10	4.61	5.12	0.44	0.88	1.33
660	0.53	1.06	1.58	2.11	2.64	3.17	3.70	4.22	4.75	5.28	0.46	0.91	1.37
680	0.54	1.09	1.63	2.18	2.72	3.26	3.81	4.35	4.90	5.44	0.47	0.94	1.41
700	0.56	1.12	1.68	2.24	2.80	3.36	3.92	4.48	5.04	5.60	0.48	0.97	1.45
720	0.58	1.15	1.73	2.30	2.88	3.46	4.03	4.61	5.18	5.76	0.50	1.00	1.49
740	0.59	1.18	1.78	2.37	2.96	3.55	4.14	4.74	5.33	5.92	0.51	1.02	1.53
760	0.61	1.21	1.83	2.44	3.04	3.65	4.26	4.87	5.48	6.08	0.53	1.05	1.57
780	0.63	1.24	1.89	2.51	3.12	3.75	4.37	5.00	5.63	6.24	0.54	1.08	1.62

Tafel IV. 3.

B mm	σ mm 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
400	41	82	128	164	206	247	289	330	371	411
420	39	78	117	156	196	235	275	314	353	391
440	37	75	112	150	187	225	262	299	337	374
460	36	72	107	143	179	215	251	286	322	358
480	34	69	103	137	172	206	240	274	309	343
500	33	66	99	132	165	198	230	263	296	329
520	32	63	95	127	158	190	221	253	284	316
540	30	61	91	122	152	183	213	244	274	305
560	29	59	88	118	147	177	206	235	265	294
580	28	58	86	114	143	171	200	228	257	284
600	28	55	83	110	139	166	194	221	248	274
620	27	53	81	107	134	160	187	214	240	267
640	26	52	78	104	130	156	181	207	233	258
660	25	50	76	101	125	151	176	200	225	250
680	24	49	74	98	122	147	171	194	218	242
700	24	47	72	95	119	142	165	189	212	235
720	23	46	69	92	115	138	160	183	206	228
740	22	45	67	89	111	134	155	178	200	222
760	22	44	66	87	108	130	151	173	195	216
780	21	42	63	84	105	126	147	169	190	211

Tafel V.

T′ — T″	
1	0.00008
2	16
3	23
4	31
5	0.00039
6	47
7	55
8	62
9	70
10	0.00078
11	86
12	94
13	101
14	109
15	0.00117
16	125
17	133
18	141
19	148
20	0.00156

Tafel VI.

Argument: Barometerstand b^{mm}.

b^{mm}	Seehöhe in Metern	Diff. für 1 mm	b^{mm}	Seehöhe in Metern	Diff. für 1 mm
400	5137.2		600	1892.0	
		−19.5			−13.2
410	4939.6		610	1759.8	
		−19.1			−13.1
420	4746.7		620	1629.9	
		−18.6			−12.9
430	4558.3		630	1501.5	
		−18.2			−12.7
440	4374.4		640	1375.5	
		−17.8			−12.5
450	4194.5		650	1251.4	
		−17.4			−12.3
460	4018.6		660	1129.1	
		−17.0			−12.1
470	3846.4		670	1008.8	
		−16.7			−12.0
480	3677.9		680	890.2	
		−16.3			−11.8
490	3512.8		690	773.3	
		−16.0			−11.6
500	3351.2		700	658.2	
		−15.7			−11.4
510	3192.7		710	544.6	
		−15.4			−11.3
520	3037.3		720	432.7	
		−15.1			−11.1
530	2884.9		730	322.4	
		−14.8			−11.0
540	2735.2		740	213.4	
		−14.5			−10.8
550	2588.4		750	105.9	
		−14.3			−10.7
560	2444.2		760	0.0	
		−14.0			−10.7
570	2302.6		770	−104.8	
		−13.8			−10.6
580	2163.3		780	−207.9	
		−13.6			−10.5
590	2026.5				
		−13.4			
600	1892.0				

Tafel VII.

$t' + t''$ °C.	Corrfact.	$t' + t''$ °C.	Corrfact.	$t' + t''$ °C.	Corrfact.	$t' + t''$ °C.	Corrfact.
1	0.0018	15	0.0275	29	0.0531	43	0.0787
2	0.0037	16	0.0293	30	0.0549	44	0.0805
3	0.0055	17	0.0311	31	0.0567	45	0.0823
4	0.0073	18	0.0329	32	0.0586	46	0.0842
5	0.0091	19	0.0348	34	0.0604	47	0.0860
6	0.0110	20	0.0366	33	0.0622	48	0.0878
7	0.0128	21	0.0384	35	0.0640	49	0.0897
8	0.0146	22	0.0403	36	0.0659	50	0.0915
9	0.0164	23	0.0421	37	0.0677	51	0.0933
10	0.0183	24	0.0439	38	0.0696	52	0.0952
11	0.0201	25	0.0458	39	0.0714	53	0.0970
12	0.0220	26	0.0476	40	0.0732	54	0.0988
13	0.0238	27	0.0495	41	0.0750	55	0.1006
14	0.0257	28	0.0513	42	0.0769	56	0.1025

Tafel VIII.

$T' - T''$ °C.	Met.	$T' - T''$ °C.	Met.
1	1.3	13	16.7
2	2.6	14	18.0
3	3.9	15	19.3
4	5.1	16	20.5
5	6.4	17	21.8
6	7.7	18	23.1
7	9.0	19	24.4
8	10.3	20	25.8
9	11.6	21	27.1
10	12.8	22	28.3
11	14.1	23	29.6
12	15.4	24	30.9
13	16.7	25	32.1

Tafel IX.

b mm	σ mm 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
400	0.0005	0.0009	0.0014	0.0019	0.0023	0.0028	0.0032	0.0037	0.0042	0.0047
420	0.0004	0.0009	0.0014	0.0018	0.0022	0.0026	0.0031	0.0036	0.0041	0.0045
440	0.0004	0.0009	0.0013	0.0017	0.0021	0.0025	0.0030	0.0035	0.0039	0.0043
460	0.0004	0.0008	0.0012	0.0016	0.0020	0.0024	0.0029	0.0033	0.0037	0.0041
480	0.0004	0.0008	0.0012	0.0016	0.0020	0.0024	0.0028	0.0032	0.0036	0.0040
500	0.0004	0.0008	0.0011	0.0015	0.0019	0.0023	0.0027	0.0031	0.0034	0.0039
520	0.0004	0.0007	0.0011	0.0015	0.0018	0.0022	0.0026	0.0030	0.0033	0.0037
540	0.0003	0.0007	0.0010	0.0014	0.0018	0.0021	0.0025	0.0029	0.0032	0.0035
560	0.0003	0.0007	0.0010	0.0014	0.0017	0.0020	0.0024	0.0028	0.0031	0.0034
580	0.0003	0.0007	0.0010	0.0013	0.0016	0.0019	0.0023	0.0027	0.0030	0.0033
600	0.0003	0.0006	0.0009	0.0012	0.0015	0.0019	0.0022	0.0025	0.0028	0.0031
620	0.0003	0.0006	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024	0.0027	0.0030
640	0.0003	0.0006	0.0009	0.0012	0.0015	0.0018	0.0021	0.0023	0.0026	0.0029
660	0.0003	0.0006	0.0009	0.0012	0.0014	0.0017	0.0020	0.0023	0.0026	0.0029
680	0.0003	0.0005	0.0008	0.0011	0.0014	0.0017	0.0019	0.0022	0.0025	0.0028
700	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0024	0.0027
720	0.0003	0.0005	0.0008	0.0010	0.0013	0.0016	0.0018	0.0020	0.0023	0.0026
740	0.0003	0.0005	0.0007	0.0010	0.0013	0.0015	0.0017	0.0020	0.0023	0.0025
760	0.0002	0.0005	0.0007	0.0010	0.0012	0.0015	0.0017	0.0020	0.0022	0.0025
780	0.0002	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0019	0.0022	0.0024

Tafel X.

Argument: $x = 45° - \psi°$.

Je nachdem $x \gtrless o$, hat man das Zeichen $\pm$ anzuwenden.

x	Corrfact.	x	Corrfact.	x	Corrfact.	x	Corrfact.
0	0.0000	12	0.0011	24	0.0019	35	0.0025
1	0.0001	13	0.0012	25	0.0020	36	0.0025
2	0.0002	14	0.0012	26	0.0020	37	0.0025
3	0.0003	15	0.0013	27	0.0021	38	0.0025
4	0.0004	16	0.0013	28	0.0021	39	0.0025
5	0.0005	17	0.0014	29	0.0022	40	0.0025
6	0.0005	18	0.0015	30	0.0022	41	0.0026
7	0.0006	19	0.0015	31	0.0023	42	0.0026
8	0.0007	20	0.0016	32	0.0023	43	0.0026
9	0.0008	21	0.0017	33	0.0024	44	0.0026
10	0.0009	22	0.0018	34	0.0024	45	0.0026
11	0.0010	23	0.0019				

Tafel XI.

h met.	z met.					
	0	100	500	1000	1500	2000
100	0.0	0.0	0.0	0.0	0.0	0.1
500	0.0	0.1	0.1	0.2	0.3	0.4
1000	0.2	0.2	0.4	0.5	0.7	0.8
1500	0.3	0.4	0.6	0.8	1.0	1.3
2000	0.6	0.7	0.9	1.2	1.5	1.9
2500	1.0	1.1	1.4	1.8	2.2	2.6
3000	1.4	1.5	1.9	2.3	2.8	3.3
4000	2.5	2.6	3.1	3.7	4.4	5.0

Siedepunkt des Wassers bei verschiedenen Barometerständen.

Barometerstand. mm	Siedepunct.	Barometerstand. mm	Siedepunct.
1075.37	110°0 C.	707.26	98° C.
787.63	101.0	682.03	97
773.71	100.5	657.54	96
760.00	100.0	633.78	95
746.52	99.5	525.45	90
733.21	99.0	433.04	85
720.13	98.5	91.98	50

26 Zoll.

Grade R.	0 lin.	1	2	3	4	5	6	7	8	9	10	11
	+	+	+	+	+	+	+	+	+	+	+	+
—14	0.79	0.79	0.79	0.80	0.80	0.80	0.80	0.81	0.81	0.81	0.81	0.82
13	72	73	73	73	73	74	74	74	74	75	75	75
12	66	66	67	67	67	67	68	68	68	68	68	69
11	60	60	60	60	61	61	61	61	61	62	62	62
10	54	54	54	54	54	54	55	55	55	55	55	55
9	47	47	48	48	48	48	48	48	48	49	49	49
8	41	41	41	41	41	42	42	42	42	42	42	42
7	35	35	35	35	35	35	35	35	36	36	36	36
6	28	28	29	29	29	29	29	29	29	29	29	29
5	22	22	22	22	22	22	22	23	23	23	23	23
4	16	16	16	16	16	16	16	16	16	16	16	16
3	09	09	09	10	10	10	10	10	10	10	10	10
2	03	03	03	03	03	03	03	03	03	03	03	03
	—	—	—	—	—	—	—	—	—	—	—	—
— 1	03	03	03	03	03	03	03	03	03	03	03	03
0	10	10	10	10	10	10	10	10	10	10	10	10
+ 1	16	16	16	12	16	16	16	16	16	16	16	16
2	22	22	22	26	22	23	23	23	23	23	23	23
3	28	29	29	29	29	29	29	29	29	29	29	29
4	35	35	35	35	35	35	35	35	36	36	36	36
5	41	41	41	41	42	42	42	42	42	42	42	42
6	47	47	48	48	48	48	48	48	48	49	49	49
7	54	54	54	54	54	54	55	55	55	55	55	55
8	60	60	60	60	61	61	61	61	61	62	62	62
9	66	66	67	67	67	67	67	68	68	68	68	68
10	72	73	73	73	73	74	74	74	74	74	75	75
11	79	79	79	79	80	80	80	80	81	81	81	81
12	85	85	85	86	86	86	87	87	87	87	88	88
13	91	91	92	92	92	92	92	93	93	93	93	94
14	97	98	98	98	99	99	99	1.00	1.00	1.00	1.01	1.01
15	1.04	1.04	1.04	1.05	1.05	1.05	1.05	06	06	07	07	07
16	10	10	11	11	11	12	12	12	13	13	13	14
17	17	17	17	17	18	18	18	19	19	19	20	20
18	22	23	23	24	24	24	25	25	26	26	26	27
19	29	29	29	30	30	31	31	32	32	32	33	33
20	35	35	36	36	37	37	38	38	38	39	39	40
21	41	42	42	42	43	43	44	44	45	45	46	46
22	47	48	48	49	49	50	50	51	51	52	52	53
23	54	54	55	55	56	56	57	57	57	58	58	59
24	1.60	1.60	1.61	1.61	1.62	1.62	1.63	1.63	1.64	1.64	1.65	1.65
Gr. R.	0 lin.	1	2	3	4	5	6	7	8	9	10	11

27 Zoll.

Grade R.	0 lin.	1	2	3	4	5	6	7	8	9	10	11
	+	+	+	+	+	+	+	+	+	+	+	+
−14	0.82	0.82	0.82	0.83	0.83	0.83	0.83	0.84	0.84	0.84	0.84	0.85
13	75	76	76	76	76	77	77	77	77	77	78	78
12	69	69	69	69	70	70	70	70	70	71	71	71
11	62	62	63	63	63	63	63	64	64	64	64	64
10	56	56	56	56	56	57	57	57	57	57	57	58
9	49	49	49	50	50	50	50	50	50	50	51	51
8	43	43	43	43	43	43	43	43	44	44	44	44
7	36	36	36	36	36	37	37	37	37	37	37	37
6	29	30	30	30	30	30	30	30	30	30	30	30
5	23	23	23	23	23	23	23	23	23	24	22	24
4	16	16	16	16	17	17	17	17	17	17	17	17
3	10	10	10	10	10	10	10	10	10	10	10	10
2	03	03	03	03	03	03	03	03	03	03	03	03
	—	—	—	—	—	—	—	—	—	—	—	—
− 1	03	03	03	03	03	03	03	03	03	03	04	04
0	10	10	10	10	10	10	10	10	10	10	10	10
+ 1	16	17	17	17	17	17	17	17	17	17	17	17
2	23	23	23	23	23	23	23	24	24	24	24	24
3	30	30	30	30	30	30	30	30	30	30	30	31
4	36	36	36	36	36	37	37	37	37	37	37	38
5	43	43	43	43	43	43	43	43	44	44	44	44
6	49	49	49	50	50	50	50	50	50	50	51	51
7	56	56	56	56	56	56	57	57	57	57	57	57
8	62	62	63	63	63	63	63	63	64	64	64	64
9	69	69	69	69	69	70	70	70	70	71	71	71
10	75	75	76	76	76	76	77	77	77	77	77	78
11	82	82	82	82	83	83	83	83	84	84	84	84
12	88	89	89	89	89	89	90	90	90	91	91	91
13	95	95	95	96	96	96	96	97	97	97	98	98
14	1.01	1.01	1.02	1.02	1.02	1.03	1.03	1.03	1.04	1.04	1.04	1.05
15	08	08	08	09	09	09	10	10	10	11	11	11
16	14	14	15	15	16	16	16	17	17	17	18	18
17	21	21	21	22	22	22	23	23	24	24	24	25
18	27	27	28	28	29	29	29	30	30	31	31	31
19	34	34	34	35	35	36	36	36	37	37	38	38
20	40	40	41	41	42	42	43	43	43	44	44	45
21	47	47	47	48	48	49	49	50	50	51	51	51
22	53	53	54	54	55	55	56	56	57	57	58	58
23	59	60	60	61	61	62	62	63	63	64	64	65
24	1.66	1.66	1.67	1.67	1.68	1.68	1.69	1.70	1.71	1.71	1.71	1.72
Gr.	0 lin.	1	2	3	4	5	6	7	8	9	10	11

28 Zoll.

Grade R.	0 lin.	1	2	3	4	5	6	7	8	9	10	11
+	+	+	+	+	+	+	+	+	+	+	+	+
—14	0.85	0.85	0.85	0.86	0.86	0.86	0.86	0.87	0.87	0.87	0.87	0.88
13	78	79	79	79	79	79	80	80	80	80	80	81
12	71	72	72	72	72	72	72	73	73	73	73	74
11	65	65	65	65	65	65	66	66	66	66	66	67
10	58	58	58	58	58	59	59	59	59	59	59	60
9	51	51	51	51	52	52	52	52	52	52	52	53
8	44	44	44	44	45	45	45	45	45	45	45	46
7	37	37	38	38	38	38	38	38	38	38	38	39
6	31	31	31	31	31	31	31	31	31	31	31	32
5	24	24	24	24	24	24	24	24	24	24	24	24
4	17	17	17	17	17	17	17	17	17	17	17	17
3	10	10	10	10	10	10	10	10	10	10	10	10
2	03	03	03	03	03	03	03	03	03	03	03	03
	—	—	—	—	—	—	—	—	—	—	—	—
— 1	04	04	04	04	04	04	04	04	04	04	04	04
0	10	10	10	10	10	10	10	11	11	11	11	11
+ 1	17	17	17	17	17	17	17	17	17	18	18	18
2	24	24	24	24	24	24	24	24	24	24	25	25
3	31	31	31	31	31	31	31	31	31	31	32	32
4	37	37	38	38	38	38	38	38	38	38	38	39
5	44	44	44	45	45	45	45	45	45	45	45	46
6	51	51	51	51	52	52	52	52	52	52	52	53
7	58	58	58	58	58	59	59	59	59	59	59	60
8	64	65	65	65	65	65	66	66	66	66	66	67
9	71	71	72	72	72	72	72	73	73	73	73	73
10	78	78	78	79	79	79	79	80	80	80	80	80
11	85	85	85	85	86	86	86	86	87	87	87	87
12	91	92	92	92	92	93	93	93	94	94	94	94
13	98	98	98	99	99	1.00	1.00	1.00	1.00	1.01	1.01	1.01
14	1.05	1.05	1.06	1.06	1.06	06	07	07	07	08	08	08
15	12	12	12	13	13	13	14	14	14	15	15	15
16	18	19	19	19	20	20	20	21	21	22	22	22
17	25	25	26	26	27	27	27	28	28	28	29	29
18	32	32	32	33	33	34	34	35	35	35	36	36
19	39	39	39	40	40	41	41	41	42	42	43	43
20	45	46	46	47	47	47	48	48	49	49	50	50
21	52	52	53	53	54	54	55	55	56	56	56	57
22	59	59	60	60	61	61	61	62	62	63	63	64
23	65	66	66	67	67	68	68	69	69	70	70	71
24	1.72	1.73	1.73	1.74	1.74	1.75	1.75	1.76	1.76	1.77	1.77	1.78
Gr.	0 lin.	1	2	3	4	5	6	7	8	9	10	11

Grade C.	705mm	710mm	715mm	720mm	725mm	730mm	735mm	740mm
	+	+	+	+	+	+	+	+
—17°	1.94	1.95	1.97	1.98	1.99	2.01	2.02	2.04
16	1.83	1.84	1.85	1.87	1.88	1.90	1.90	1.92
15	1.71	1.72	1.74	1.75	1.76	1.77	1.78	1.80
14	1.60	1.61	1.62	1.63	1.64	1.65	1.67	1.68
13	1.48	1.49	1.50	1.51	1.53	1.54	1.55	1.56
12	1.37	1.38	1.39	1.40	1.40	1.42	1.43	1.44
11	1.25	1.26	1.27	1.28	1.29	1.30	1.31	1.32
10	1.14	1.15	1.16	1.16	1.17	1.18	1.19	1.20
9	1.03	1.03	1.04	1.05	1.05	1.06	1.07	1.08
8	0.91	0.92	0.93	0.93	0.94	0.94	0.95	0.96
7	0.80	0.80	0.81	0.81	0.82	0.83	0.83	0.84
6	0.68	0.69	0.69	0.70	0.70	0.71	0.71	0.72
5	0.57	0.57	0.58	0.58	0.59	0.60	0.60	0.60
4	0.45	0.46	0.46	0.47	0.47	0.47	0.48	0.48
3	0.34	0.34	0.35	0.35	0.35	0.35	0.36	0.36
2	0.23	0.23	0.23	0.23	0.23	0.24	0.24	0.24
— 1	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12
0	+ —	+ —	+ —	+ —	+ —	+ —	+ —	+ —
+ 1	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12
2	0.23	0.23	0.23	0.23	0.23	0.24	0.24	0.24
3	0.34	0.34	0.35	0.35	0.35	0.35	0.36	0.36
4	0.45	0.46	0.46	0.46	0.47	0.47	0.47	0.48
5	0.57	0.57	0.58	0.58	0.58	0.59	0.60	0.60
6	0.68	0.69	0.69	0.70	0.70	0.71	0.71	0.72
7	0.79	0.80	0.81	0.81	0.82	0.82	0.83	0.84
8	0.91	0.92	0.93	0.93	0.94	0.94	0.95	0.95
9	1.02	1.03	1.04	1.04	1.05	1.06	1.06	1.07
10	1.14	1.14	1.15	1.16	1.17	1.18	1.19	1.19
11	1.25	1.26	1.27	1.28	1.28	1.29	1.30	1.31
12	1.36	1.37	1.38	1.39	1.40	1.41	1.42	1.43
13	1.48	1.49	1.50	1.51	1.52	1.53	1.54	1.55
14	1.59	1.60	1.61	1.62	1.63	1.64	1.66	1.67
15	1.70	1.71	1.73	1.74	1.75	1.76	1.78	1.79
16	1.82	1.83	1.84	1.85	1.87	1.88	1.89	1.91
17	1.93	1.94	1.96	1.97	1.98	2.00	2.01	2.02
18	2.04	2.06	2.07	2.08	2.10	2.11	2.13	2.14
19	2.16	2.17	2.19	2.20	2.22	2.23	2.25	2.26
20	2.27	2.28	2.30	2.32	2.33	2.35	2.36	2.38
21	2.38	2.40	2.41	2.43	2.45	2.47	2.48	2.50
22	2.49	2.51	2.53	2.55	2.56	2.58	2.60	2.62
23	2.61	2.63	2.64	2.66	2.68	2.70	2.72	2.74
24	2.72	2.74	2.76	2.78	2.80	2.82	2.84	2.85
25	2.83	2.85	2.87	2.89	2.91	2.93	2.95	2.97
26	2.94	2.97	2.99	3.01	3.03	3.05	3.07	3.09
27	3.06	3.08	3.10	3.12	3.14	3.17	3.19	3.21
28	3.17	3.19	3.21	3.24	3.26	3.28	3.30	3.33
29	3.28	3.31	3.33	3.35	3.38	3.40	3.42	3.45
30	3.40	3.42	3.44	3.47	3.49	3.52	3.54	3.56
31	3.51	3.53	3.56	3.58	3.61	3.63	3.66	3.68
32	3.62	3.65	3.67	3.70	3.72	3.75	3.77	3.80

745mm	750mm	755mm	760mm	765mm	770mm	775mm	780mm	Grade C.
+	+	+	+	+	+	+	+	
2.05	2.06	2.08	2.09	2.11	2.12	2.13	2.14	−17°
1.93	1.94	1.95	1.97	1.98	1.99	2.01	2.02	16
1.81	1.82	1.83	1.84	1.86	1.87	1.88	1.89	15
1.69	1.70	1.71	1.72	1.73	1.74	1.76	1.77	14
1.57	1.58	1.59	1.60	1.61	1.62	1.63	1.64	13
1.45	1.46	1.46	1.47	1.49	1.49	1.50	1.50	12
1.33	1.33	1.34	1.35	1.36	1.37	1.38	1.38	11
1.20	1.21	1.22	1.23	1.24	1.24	1.25	1.25	10
1.08	1.09	1.10	1.11	1.11	1.12	1.13	1.14	9
0.96	0.97	0.98	0.98	0.99	1.00	1.00	1.01	8
0.84	0.85	0.85	0.86	0.87	0.87	0.88	0.88	7
0.72	0.73	0.73	0.74	0.74	0.75	0.75	0.76	6
0.60	0.61	0.61	0.61	0.62	0.62	0.63	0.63	5
0.48	0.48	0.49	0.49	0.49	0.50	0.50	0.51	4
0.36	0.36	0.36	0.37	0.37	0.37	0.38	0.38	3
0.24	0.24	0.24	0.24	0.25	0.25	0.25	0.25	2
0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	— 1
+	+	+	+	+	+	+	+	0
−	−	−	−	−	−	−	−	
0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	+ 1
0.24	0.24	0.24	0.25	0.25	0.25	0.25	0.25	2
0.36	0.36	0.36	0.37	0.37	0.37	0.38	0.38	3
0.48	0.48	0.49	0.49	0.49	0.50	0.50	0.51	4
0.60	0.60	0.61	0.61	0.62	0.62	0.63	0.63	5
0.72	0.73	0.73	0.74	0.74	0.75	0.75	0.76	6
0.84	0.85	0.85	0.86	0.86	0.87	0.87	0.88	7
0.96	0.97	0.97	0.98	0.99	0.99	1.00	1.00	8
0.08	1.09	1.10	1.10	1.11	1.12	1.12	1.13	9
1.20	1.21	1.22	1.22	1.23	1.24	1.25	1.26	10
1.32	1.33	1.34	1.35	1.36	1.36	1.37	1.37	11
1.44	1.45	1.46	1.47	1.48	1.49	1.50	1.51	12
1.56	1.57	1.58	1.59	1.60	1.61	1.62	1.63	13
1.68	1.69	1.70	1.71	1.72	1.74	1.75	1.76	14
1.80	1.81	1.82	1.84	1.85	1.86	1.87	1.88	15
1.92	1.93	1.94	1.96	1.97	1.98	2.00	2.01	16
2.04	2.05	2.07	2.08	2.09	2.11	2.12	2.13	17
2.16	2.17	2.19	2.20	2.22	2.23	2.25	2.26	18
2.28	2.29	2.31	2.32	2.34	2.35	2.37	2.38	19
2.40	2.41	2.43	2.44	2.46	2.48	2.49	2.50	20
2.52	2.53	2.55	2.57	2.58	2.60	2.62	2.63	21
2.63	2.65	2.67	2.69	2.71	2.72	2.74	2.76	22
2.75	2.77	2.79	2.81	2.83	2.85	2.87	2.89	23
2.87	2.89	2.91	2.93	2.95	2.97	2.99	3.01	24
2.99	3.01	3.03	3.05	3.07	3.09	3.11	3.13	25
3.11	3.13	3.15	3.17	3.19	3.22	3.24	3.26	29
3.23	3.25	3.27	3.30	3.32	3.34	3.36	3.38	27
3.35	3.37	3.39	3.42	3.44	3.46	3.48	3.50	28
3.47	3.49	3.52	3.54	3.56	3.59	3.61	3.63	29
3.59	3.61	3.64	3.66	3.68	3.71	3.73	3.75	30
3.71	3.73	3.76	3.78	3.81	3.83	3.86	3.89	31
3.83	3.85	3.88	3.90	3.93	3.95	3.98	4.01	32

27 Zoll.

F°	0	1	2	3	4	5	6	7	8	9
	+	+	+	+	+	+	+	+	+	+
0	0692	0695	0698	0700	0703	0705	0708	0710	0713	0715
1	0668	0671	0673	0675	0678	0680	0683	0685	0688	0690
2	0644	0646	0648	0651	0653	0656	0658	0660	0663	0665
3	0619	0622	0624	0626	0629	0631	0633	0635	0638	0640
4	0595	0597	0599	0602	0604	0606	0608	0610	0613	0615
5	0571	0573	0575	0577	0579	0581	0583	0585	0588	0590
6	0546	0548	0550	0552	0554	0556	0559	0561	0563	0565
7	0522	0524	0526	0528	0530	0532	0534	0536	0537	0539
8	0498	0500	0501	0503	0505	0507	0509	0511	0512	0514
9	0473	0475	0477	0479	0480	0482	0484	0486	0487	0489
10	0449	0451	0452	0454	0456	0457	0459	0461	0462	0464
11	0425	0426	0428	0429	0431	0433	0434	0436	0437	0439
12	0400	0402	0403	0405	0406	0408	0409	0411	0412	0414
13	0376	0378	0379	0380	0382	0383	0385	0386	0387	0389
14	0352	0353	0355	0356	0357	0358	0360	0361	0362	0364
15	0328	0329	0330	0331	0332	0334	0335	0336	0337	0339
16	0303	0304	0306	0307	0308	0309	0310	0311	0312	0313
17	0279	0280	0281	0282	0283	0284	0285	0286	0287	0288
18	0255	0256	0257	0258	0259	0259	0260	0261	0262	0263
19	0231	0231	0232	0233	0234	0235	0236	0236	0237	0238
20	0206	0207	0208	0209	0209	0210	0211	0212	0212	0213
21	0182	0183	0183	0184	0185	0185	0186	0187	0187	0188
22	0158	0158	0159	0159	0160	0161	0161	0162	0162	0163
23	0133	0134	0134	0135	0135	0136	0136	0137	0137	0138
24	0109	0110	0110	0110	0111	0111	0112	0112	0112	0113
25	0085	0085	0086	0086	0086	0087	0087	0087	0088	0088
26	0061	0061	0061	0062	0062	0062	0062	0062	0063	0063
27	0037	0037	0037	0037	0037	0037	0037	0037	0038	0038
28	0012	0012	0012	0012	0013	0013	0013	0013	0013	0013
	+	+	+	+	+	+	+	+	+	+
	−	−	−	−	−	−	−	−	−	−
29	0012	0012	0012	0012	0012	0012	0012	0012	0012	0012
30	0036	0036	0036	0037	0037	0037	0037	0037	0037	0037
31	0060	0061	0061	0061	0061	0061	0062	0062	0062	0062
32	0085	0085	0085	0085	0086	0086	0086	0087	0087	0087
33	0109	0109	0110	0110	0110	0111	0111	0112	0112	0112
34	0133	0133	0134	0134	0135	0135	0136	0136	0137	0137
35	0157	0158	0158	0159	0159	0160	0161	0161	0162	0162
36	0181	0182	0183	0183	0184	0185	0185	0186	0187	0187
37	0205	0206	0207	0208	0209	0209	0210	0211	0212	0212
38	0230	0230	0231	0232	0233	0234	0235	0236	0236	0237
39	0254	0255	0256	0257	0258	0259	0259	0260	0261	0262
40	0278	0279	0280	0281	0282	0283	0284	0285	0286	0287
41	0302	0303	0304	0305	0307	0308	0309	0310	0311	0312
42	0326	0327	0329	0330	0331	0332	0334	0335	0336	0337
43	0350	0352	0353	0354	0356	0357	0358	0360	0361	0362
44	0375	0376	0377	0379	0380	0381	0383	0384	0386	0387
	−	−	−	−	−	−	−	−	−	−
F°	0	1	2	3	4	5	6	7	8	9

28 Zoll.

0	1	2	3	4	5	6	7	8	9	F°
+	+	+	+	+	+	+	+	+	+	
0718	0721	0723	0726	0728	0731	0733	0736	0739	0741	0
0693	0695	0698	0700	0703	0705	0708	0710	0713	0715	1
0668	0670	0672	0675	0677	0679	0682	0684	0687	0689	2
0642	0645	0647	0649	0651	0654	0656	0658	0661	0663	3
0617	0619	0621	0624	0626	0628	0630	0632	0635	0637	4
0592	0594	0596	0598	0600	0602	0605	0607	0609	0611	5
0567	0569	0571	0573	0575	0577	0579	0581	0583	0585	6
0541	0543	0545	0547	0549	0551	0553	0555	0557	0559	7
0516	0518	0520	0522	0524	0525	0527	0529	0531	0533	8
0491	0493	0494	0496	0498	0500	0501	0503	0505	0507	9
0466	0468	0469	0471	0472	0474	0476	0478	0479	0481	10
0441	0442	0444	0445	0447	0448	0450	0452	0453	0455	11
0415	0417	0418	0420	0421	0423	0424	0426	0427	0429	12
0390	0392	0393	0394	0396	0397	0398	0400	0401	0403	13
0365	0366	0368	0369	0370	0371	0373	0374	0375	0377	14
0340	0341	0342	0343	0345	0346	0347	0348	0349	0351	15
0315	0316	0317	0318	0319	0320	0321	0322	0324	0325	16
0289	0290	0291	0292	0294	0295	0296	0297	0298	0299	17
0264	0265	0266	0267	0268	0269	0260	0271	0272	0273	18
0239	0240	0241	0242	0242	0243	0244	0245	0246	0247	19
0214	0215	0215	0216	0217	0218	0218	0219	0220	0221	20
0189	0189	0190	0191	0191	0192	0193	0193	0194	0195	21
0164	0164	0165	0165	0166	0166	0167	0168	0168	0169	22
0138	0139	0139	0140	0140	0141	0141	0142	0142	0143	23
0113	0114	0114	0115	0115	0115	0116	0116	0117	0117	24
0088	0088	0089	0089	0089	0090	0099	0090	0091	0091	25
0063	0063	0063	0064	0064	0064	0064	0065	0065	0065	26
0038	0038	0038	0038	0038	0039	0039	0039	0039	0039	27
0013	0013	0013	0013	0013	0013	0013	0013	0013	0013	28
+	+	+	+	+	+	+	+	+	+	
—	—	—	—	—	—	—	—	—	—	
0012	0012	0012	0012	0013	0013	0013	0013	0013	0013	29
0037	0038	0038	0038	0038	0038	0038	0038	0039	0039	30
0063	0063	0063	0063	0063	0064	0064	0064	0064	0065	31
0088	0088	0088	0089	0089	0089	0090	0090	0090	0090	32
0113	0113	0114	0114	0114	0115	0115	0115	0116	0116	33
0138	0138	0139	0139	0140	0140	0141	0141	0142	0142	34
0163	0164	0164	0165	0165	0166	0166	0167	0168	0168	35
0188	0189	0189	0190	0191	0191	0192	0193	0193	0194	36
0213	0214	0215	0215	0216	0217	0218	0218	0219	0220	37
0238	0239	0240	0241	0242	0242	0243	0244	0245	0246	38
0263	0264	0265	0266	0267	0268	0269	0270	0271	0272	39
0288	0289	0291	0291	0292	0293	0294	0295	0297	0298	40
0313	0314	0316	0317	0318	0319	0320	0321	0322	0323	41
0338	0340	0341	0342	0343	0344	0346	0347	0348	0349	42
0363	0365	0366	0367	0369	0370	0371	0373	0374	0375	43
0388	0390	0391	0393	0394	0395	0397	0398	0400	0401	44
—	—	—	—	—	—	—	—	—	—	
0	1	2	3	4	5	6	7	8	9	F°

27 Zoll.

F°	0	1	2	3	4	5	6	7	8	9
	—	—	—	—	—	—	—	—	—	—
45	0399	0400	0402	0403	0405	0406	0408	0409	0411	0412
46	0423	0424	0426	0428	0429	0431	0432	0434	0435	0437
47	0447	0449	0450	0452	0454	0455	0457	0459	0460	0462
48	0471	0473	0475	0476	0478	0480	0482	0483	0485	0487
49	0495	0497	0499	0501	0513	0504	0506	0508	0510	0512
50	0519	0521	0523	0525	0527	0529	0531	0533	0535	0537
51	0543	0545	0547	0550	0552	0554	0556	0558	0560	0562
52	0568	0570	0572	0574	0576	0578	0580	0582	0584	0586
53	0592	0594	0596	0598	0600	0603	0605	0607	0609	0611
54	0616	0618	0620	0623	0625	0627	0629	0632	0634	0636
55	0640	0642	0645	0647	0649	0652	0654	0656	0659	0661
56	0664	0666	0669	0671	0674	0676	0679	0681	0684	0686
57	0688	0691	0693	0696	0698	0701	0703	0706	0708	0711
58	0712	0715	0717	0720	0723	0725	0728	0731	0733	0736
59	0736	0739	0742	0744	0747	0750	0753	0755	0758	0761
60	0760	0763	0766	0769	0772	0774	0777	0780	0783	0786
61	0784	0787	0790	0793	0796	0799	0802	0805	0808	0810
62	0808	0811	0814	0817	0820	0823	0826	0829	0832	0835
63	0832	0836	0839	0842	0845	0848	0851	0854	0857	0860
64	0856	0860	0863	0866	0869	0872	0876	0879	0882	0885
65	0881	0884	0887	0890	0894	0897	0900	0903	0907	0910
66	0905	0908	0911	0915	0918	0921	0925	0928	0931	0935
67	0929	0932	0935	0939	0942	0946	0949	0953	0956	0960
68	0953	0956	0960	0963	0967	0970	0974	0977	0981	0984
69	0977	0980	0984	0988	0991	0995	0998	1002	1006	1009
70	1001	1004	1008	1012	1016	1019	1023	1027	1030	1034
71	1025	1028	1032	1036	1040	1044	1047	1051	1055	1059
72	1049	1052	1056	1060	1064	1068	1072	1076	1080	1084
73	1073	1077	1081	1085	1089	1093	1097	1101	1104	1108
74	1197	1101	1105	1109	1113	1117	1121	1125	1129	1133
75	1121	1125	1129	1133	1137	1141	1146	1150	1154	1158
76	1145	1149	1153	1157	1162	1166	1170	1174	1179	1183
77	1169	1173	1177	1182	1186	1190	1195	1199	1203	1208
78	1193	1197	1202	1206	1210	1215	1219	1224	1228	1232
79	1217	1221	1226	1230	1235	1239	1244	1248	1253	1257
80	1241	1245	1250	1254	1259	1264	1268	1273	1277	1282
81	1265	1269	1274	1279	1283	1288	1293	1297	1302	1307
82	1289	1293	1298	1303	1308	1312	1317	1322	1327	1332
83	1313	1317	1322	1327	1332	1337	1342	1347	1351	1356
84	1336	1341	1346	1351	1356	1361	1366	1371	1376	1381
85	1360	1365	1370	1376	1381	1386	1391	1396	1401	1406
86	1384	1389	1395	1400	1405	1410	1415	1420	1425	1431
87	1408	1414	1419	1424	1429	1434	1440	1445	1450	1455
88	1432	1438	1443	1448	1453	1459	1464	1469	1475	1480
89	1456	1462	1467	1472	1478	1483	1489	1494	1499	1505
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F°	0	1	2	3	4	5	6	7	8	9

28 Zoll.

0	1	2	3	4	5	6	7	8	9	F°
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0413	0415	0416	0417	0418	0421	0422	0424	0425	0427	45
0439	0440	0442	0443	0445	0446	0448	0449	0451	0453	46
0464	0465	0467	0469	0470	0472	0473	0475	0477	0478	47
0489	0490	0492	0494	0496	0497	0499	0501	0503	0504	48
0514	0515	0517	0519	0521	0523	0525	0526	0528	0530	49
0539	0541	0542	0544	0546	0548	0550	0552	0554	0556	50
0564	0566	0568	0570	0572	0574	0576	0578	0580	0582	51
0589	0591	0593	0595	0597	0599	0601	0603	0605	0608	52
0614	0616	0618	0620	0622	0625	0627	0629	0631	0633	53
0639	0641	0643	0645	0648	0650	0652	0655	0657	0659	54
0664	0666	0668	0671	0673	0675	0678	0680	0683	0685	55
0689	0691	0693	0696	0698	0701	0703	0706	0708	0711	56
0714	0716	0719	0721	0724	0726	0729	0731	0734	0736	57
0738	0741	0744	0746	0749	0752	0754	0757	0760	0762	58
0763	0766	0769	0772	0774	0777	0780	0783	0785	0788	59
0788	0791	0794	0797	0800	0802	0805	0808	0811	0814	60
0813	0816	0819	0822	0825	0828	0831	0834	0837	0840	61
0838	0841	0844	0847	0850	0853	0856	0859	0862	0865	62
0863	0866	0869	0873	0876	0879	0882	0885	0888	0891	63
0888	0891	0895	0898	0901	0904	0907	0910	0914	0917	64
0913	0916	0920	0923	0926	0929	0933	0936	0939	0942	65
0938	0941	0945	0948	0951	0955	0958	0962	0965	0968	66
0963	0966	0970	0973	0977	0980	0984	0987	0991	0994	67
0988	0991	0995	0999	1002	1006	1009	1013	1016	1020	68
1013	1016	1020	1024	1027	1031	1035	1038	1042	1045	69
1038	1041	1045	1049	1053	1056	1060	1064	1067	1071	70
1063	1066	1070	1074	1078	1082	1085	1089	1093	1097	71
1088	1091	1095	1099	1103	1107	1111	1115	1119	1123	72
1112	1116	1120	1124	1128	1132	1136	1140	1144	1148	73
1137	1141	1145	1150	1154	1158	1162	1166	1170	1174	74
1162	1166	1171	1175	1179	1183	1187	1191	1195	1200	75
1187	1191	1196	1200	1204	1208	1213	1217	1221	1225	76
1212	1216	1221	1225	1229	1234	1238	1242	1247	1251	77
1237	1241	1246	1250	1255	1259	1263	1268	1272	1277	78
1262	1266	1271	1275	1280	1284	1289	1293	1298	1302	79
1287	1291	1296	1300	1305	1310	1314	1319	1323	1328	80
1311	1316	1321	1325	1330	1335	1339	1341	1349	1354	81
1336	1341	1346	1351	1355	1360	1365	1370	1374	1379	82
1361	1366	1371	1376	1381	1385	1390	1395	1400	1405	83
1386	1391	1396	1401	1406	1411	1416	1421	1426	1431	84
1411	1416	1421	1426	1431	1436	1441	1446	1451	1456	85
1436	1441	1446	1451	1456	1461	1466	1472	1477	1482	86
1460	1466	1471	1476	1481	1487	1492	1497	1502	1507	87
1485	1491	1496	1501	1506	1512	1517	1522	1528	1533	88
1510	1515	1521	1526	1532	1537	1542	1548	1553	1559	89
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0	1	2	3	4	5	6	7	8	9	F°

29 Zoll.

F°	0	1	2	3	4	5	6	7	8	9
	+	+	+	+	+	+	+	+	+	+
0	0744	0746	0749	0751	0754	0757	0759	0762	0764	0767
1	0718	0720	0723	0725	0728	0730	0733	0735	0738	0740
2	0691	0694	0696	0699	0701	0703	0706	0708	0710	0713
3	0665	0668	0670	0672	0674	0677	0679	0681	0684	0686
4	0639	0641	0644	0646	0648	0650	0652	0655	0657	0659
5	0613	0615	0617	0619	0621	0624	0626	0628	0630	0632
6	0587	0589	0591	0593	0595	0597	0599	0601	0603	0606
7	0561	0563	0565	0567	0568	0570	0572	0574	0576	0578
8	0535	0536	0538	0540	0542	0544	0546	0547	0549	0551
9	0508	0510	0512	0514	0515	0517	0519	0521	0522	0524
10	0482	0484	0486	0487	0489	0491	0492	0494	0496	0497
11	0456	0458	0459	0461	0463	0464	0466	0467	0469	0470
12	0430	0432	0433	0435	0436	0438	0439	0441	0442	0443
13	0404	0405	0407	0408	0410	0411	0412	0414	0415	0417
14	0378	0379	0381	0382	0383	0384	0386	0387	0388	0390
15	0352	0353	0354	0356	0357	0358	0359	0360	0362	0363
16	0326	0327	0328	0329	0330	0331	0333	0334	0335	0336
17	0300	0301	0302	0303	0304	0305	0306	0307	0308	0309
18	0274	0275	0276	0276	0277	0278	0279	0280	0281	0282
19	0248	0248	0249	0250	0251	0252	0253	0254	0254	0255
20	0222	0222	0223	0224	0225	0225	0226	0227	0228	0228
21	0195	0196	0197	0197	0198	0199	0200	0200	0201	0202
22	0169	0170	0171	0171	0172	0172	0173	0174	0174	0175
23	0143	0144	0144	0145	0145	0146	0146	0147	0147	0148
24	0117	0118	0118	0119	0119	0119	0120	0120	0121	0121
25	0091	0092	0092	0092	0093	0093	0093	0094	0094	0094
26	0065	0066	0066	0066	0066	0066	0067	0067	0067	0067
27	0039	0039	0040	0040	0040	0040	0040	0040	0040	0040
28	0013	0013	0013	0013	0013	0013	0014	0014	0014	0014
	+	+	+	+	+	+	+	+	+	+
	—	—	—	—	—	—	—	—	—	—
29	0013	0013	0013	0013	0013	0013	0013	0013	0013	0013
30	0039	0039	0039	0039	0039	0039	0040	0040	0040	0040
31	0065	0065	0065	0065	0066	0066	0066	0066	0067	0067
32	0091	0091	0091	0092	0092	0092	0093	0093	0093	0094
33	0117	0117	0118	0118	0118	0119	0119	0120	0120	0120
34	0143	0143	0144	0144	0145	0145	0146	0146	0147	0147
35	0169	0169	0170	0170	0171	0172	0172	0173	0173	0174
36	0195	0195	0196	0197	0197	0198	0199	0199	0200	0201
37	0221	0221	0222	0223	0224	0224	0225	0226	0227	0228
38	0247	0247	0248	0249	0250	0251	0252	0253	0253	0254
39	0273	0274	0274	0275	0276	0277	0278	0279	0280	0281
40	0299	0300	0301	0302	0303	0304	0305	0306	0307	0308
41	0325	0326	0327	0328	0329	0330	0331	0332	0333	0335
42	0350	0352	0353	0354	0355	0357	0358	0359	0360	0361
43	0376	0378	0379	0380	0382	0383	0384	0385	0387	0388
44	0402	0404	0405	0406	0408	0409	0411	0412	0413	0415
	—	—	—	—	—	—	—	—	—	—
F°	0	1	2	3	4	5	6	7	8	9

30 Zoll.

0	1	2	3	4	5	6	7	8	9	F°
+	+	+	+	+	+	+	+	+	+	
0769	0772	0774	0777	0780	0782	0785	0787	0790	0792	0
0742	0745	0747	0750	0753	0755	0757	0760	0763	0765	1
0715	0718	0720	0722	0725	0727	0730	0732	0734	0737	2
0688	0690	0693	0695	0697	0700	0702	0704	0707	0709	3
0661	0663	0666	0668	0670	0672	0674	0677	0679	0681	4
0634	0636	0638	0640	0643	0645	0647	0649	0651	0653	5
0607	0609	0611	0613	0615	0617	0619	0621	0623	0625	6
0580	0582	0584	0586	0588	0590	0592	0594	0595	0597	7
0553	0555	0557	0559	0560	0562	0564	0566	0568	0570	8
0526	0528	0529	0531	0533	0535	0537	0538	0540	0542	9
0499	0501	0502	0504	0506	0507	0509	0511	0512	0514	10
0472	0474	0475	0477	0478	0480	0481	0483	0485	0486	11
0445	0446	0448	0449	0451	0452	0454	0455	0457	0458	12
0418	0419	0421	0422	0424	0425	0426	0428	0429	0431	13
0391	0392	0394	0395	0396	0398	0399	0400	0401	0403	14
0364	0365	0366	0368	0369	0370	0371	0372	0374	0375	15
0337	0338	0339	0340	0342	0343	0344	0345	0346	0347	16
0310	0311	0312	0313	0314	0315	0316	0317	0318	0319	17
0283	0284	0285	0286	0287	0288	0289	0290	0291	0292	18
0256	0257	0258	0259	0260	0260	0261	0262	0263	0264	19
0229	0230	0231	0231	0232	0233	0234	0235	0235	0236	20
0202	0203	0204	0204	0205	0206	0206	0207	0208	0208	21
0175	0176	0176	0177	0178	0178	0179	0179	0180	0181	22
0148	0149	0149	0150	0150	0151	0151	0152	0152	0153	23
0121	0122	0122	0123	0123	0123	0124	0124	0125	0125	24
0094	0095	0095	0095	0096	0096	0096	0097	0097	0097	25
0068	0068	0068	0068	0068	0069	0069	0069	0069	0070	26
0041	0041	0041	0041	0041	0041	0041	0042	0042	0042	27
0014	0014	0014	0014	0014	0014	0014	0014	0014	0014	28
+	+	+	+	+	+	+	+	+	+	
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0013	0013	0013	0013	0013	0013	0013	0014	0014	0014	29
0040	0040	0040	0041	0041	0041	0041	0041	0041	0041	30
0067	0067	0067	0068	0068	0068	0068	0069	0069	0069	31
0094	0094	0095	0095	0095	0095	0096	0096	0096	0097	32
0121	0121	0122	0122	0122	0123	0123	0124	0124	0124	33
0148	0148	0149	0149	0150	0150	0151	0151	0152	0152	34
0175	0175	0176	0176	0177	0177	0178	0179	0179	0180	35
0201	0202	0203	0203	0204	0205	0205	0206	0207	0207	36
0228	0229	0230	0231	0231	0232	0233	0234	0234	0235	37
0255	0256	0257	0258	0259	0259	0260	0261	0262	0263	38
0282	0283	0284	0285	0286	0287	0288	0289	0290	0290	39
0309	0310	0311	0312	0313	0314	0315	0316	0317	0318	40
0336	0337	0338	0339	0340	0341	0342	0344	0345	0346	41
0363	0364	0365	0366	0367	0369	0370	0371	0372	0373	42
0389	0391	0392	0393	0395	0396	0397	0398	0400	0401	43
0416	0418	0419	0420	0422	0423	0425	0426	0427	0429	44
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0	1	2	3	4	5	6	7	8	9	F°

29 Zoll.

F°	0	1	2	3	4	5	6	7	8	9
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45	0428	0430	0431	0433	0434	0434	0437	0439	0440	0442
46	0454	0456	0457	0459	0460	0462	0464	0465	0467	0468
47	0480	0482	0483	0485	0487	0489	0490	0492	0493	0495
48	0506	0508	0510	0511	0513	0515	0516	0518	0520	0522
49	0532	0534	0536	0537	0539	0541	0543	0545	0547	0548
50	0558	0560	0562	0564	0566	0567	0569	0571	0573	0575
51	0584	0586	0588	0590	0592	0594	0596	0598	0600	0602
52	0610	0612	0614	0616	0618	0620	0622	0624	0626	0629
53	0636	0638	0640	0642	0644	0646	0649	0651	0653	0655
54	0661	0664	0666	0668	0671	0673	0675	0677	0680	0682
55	0687	0690	0692	0694	0697	0699	0701	0704	0706	0709
56	0715	0716	0718	0721	0723	0726	0728	0730	0733	0735
57	0739	0742	0744	0747	0749	0752	0754	0757	0759	0762
58	0765	0768	0770	0773	0775	0778	0781	0783	0786	0789
59	0791	0793	0796	0799	0802	0804	0807	0810	0813	0815
60	0817	0819	0822	0825	0828	0831	0833	0836	0839	0842
61	0842	0845	0848	0851	0854	0857	0860	0863	0866	0868
62	0868	0871	0874	0877	0880	0883	0886	0889	0892	0895
63	0894	0897	0900	0903	0906	0910	0913	0916	0919	0922
64	0920	0923	0926	0929	0933	0936	0939	0942	0945	0948
65	0946	0949	0952	0956	0959	0962	0965	0969	0972	0975
66	0972	0975	0978	0982	0985	0988	0992	0995	0998	1002
67	0997	1001	1004	1008	1011	1015	1018	1021	1025	1028
68	1023	1027	1030	1034	1037	1041	1044	1048	1051	1055
69	1049	1053	1056	1060	1063	1067	1071	1074	1078	1082
70	1075	1079	1082	1086	1090	1093	1097	1101	1104	1108
71	1101	1104	1108	1112	1116	1120	1123	1127	1131	1135
72	1126	1130	1134	1138	1142	1146	1150	1154	1157	1161
73	1152	1156	1160	1164	1168	1172	1176	1180	1184	1188
74	1178	1182	1186	1190	1194	1198	1202	1206	1210	1215
75	1204	1208	1212	1216	1220	1224	1229	1233	1237	1241
76	1229	1234	1238	1242	1246	1251	1255	1259	1263	1268
77	1255	1260	1264	1268	1273	1277	1281	1286	1290	1294
78	1281	1285	1290	1294	1299	1303	1308	1312	1316	1321
79	1307	1311	1316	1320	1325	1329	1334	1338	1343	1347
80	1333	1337	1342	1346	1351	1355	1360	1365	1369	1374
81	1358	1363	1368	1372	1377	1382	1386	1391	1396	1400
82	1384	1389	1394	1398	1403	1408	1413	1417	1422	1427
83	1410	1415	1419	1424	1429	1434	1439	1444	1449	1453
84	1435	1440	1445	1450	1455	1460	1465	1470	1475	1480
85	1461	1466	1471	1476	1481	1486	1491	1496	1501	1507
86	1487	1492	1497	1502	1507	1513	1518	1523	1528	1533
87	1513	1518	1523	1528	1533	1539	1544	1549	1554	1560
88	1538	1544	1549	1554	1560	1565	1570	1575	1581	1586
89	1564	1569	1575	1580	1586	1591	1596	1602	1607	1613
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F°	0	1	2	3	4	5	6	7	8	9

30 Zoll.

0	1	2	3	4	5	6	7	8	9	F°
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0443	0445	0446	0447	0449	0450	0452	0453	0455	0456	45
0470	0471	0473	0475	0476	0478	0479	0481	0482	0484	46
0497	0498	0500	0502	0503	0505	0507	0509	0510	0512	47
0523	0525	0527	0529	0530	0532	0534	0536	0537	0539	48
0550	0552	0554	0556	0558	0559	0561	0563	0565	0567	49
0577	0579	0581	0583	0585	0587	0589	0591	0592	0594	50
0604	0606	0608	0610	0612	0614	0616	0618	0620	0622	51
0631	0633	0635	0637	0639	0641	0643	0645	0647	0650	52
0657	0660	0662	0664	0666	0668	0671	0673	0675	0677	53
0684	0686	0689	0691	0693	0696	0698	0700	0702	0705	54
0711	0713	0716	0718	0720	0723	0725	0727	0730	0732	55
0738	0740	0743	0745	0748	0750	0752	0755	0757	0760	56
0764	0767	0770	0772	0775	0777	0780	0782	0785	0787	57
0791	0794	0797	0799	0802	0805	0807	0810	0812	0815	58
0818	0821	0823	0826	0829	0832	0834	0837	0840	0843	59
0845	0848	0850	0853	0856	0859	0862	0864	0867	0870	60
0871	0874	0877	0880	0883	0886	0889	0892	0895	0898	61
0898	0901	0904	0907	0910	0913	0916	0919	0922	0925	62
0925	0928	0931	0934	0937	0940	0943	0947	0950	0953	63
0952	0955	0958	0961	0964	0968	0971	0974	0977	0980	64
0978	0982	0985	0988	0991	0995	0998	1001	1004	1008	65
1005	1008	1012	1015	1018	1022	1025	1029	1032	1035	66
1032	1035	1039	1042	1046	1049	1052	1056	1059	1063	67
1058	1062	1066	1069	1073	1076	1080	1083	1087	1090	68
1085	1089	1092	1096	1100	1103	1107	1110	1114	1118	69
1112	1116	1119	1123	1127	1130	1134	1138	1142	1145	70
1139	1142	1146	1150	1154	1158	1161	1165	1169	1173	71
1165	1169	1173	1177	1181	1185	1189	1192	1196	1200	72
1192	1196	1200	1204	1208	1212	1216	1220	1224	1228	73
1219	1223	1227	1231	1235	1239	1243	1247	1251	1255	74
1245	1249	1254	1258	1262	1266	1270	1274	1278	1283	75
1272	1276	1280	1285	1289	1293	1297	1302	1306	1310	76
1299	1303	1307	1312	1316	1320	1325	1329	1333	1338	77
1325	1330	1334	1338	1343	1347	1352	1356	1361	1365	78
1352	1356	1361	1365	1370	1374	1379	1383	1388	1392	79
1378	1383	1388	1392	1397	1401	1406	1411	1415	1420	80
1405	1410	1414	1419	1424	1429	1433	1438	1433	1447	81
1432	1437	1441	1446	1451	1456	1460	1465	1470	1475	82
1458	1463	1468	1473	1478	1483	1488	1492	1497	1502	83
1485	1490	1495	1500	1505	1510	1515	1520	1525	1530	84
1512	1517	1522	1527	1532	1537	1542	1547	1552	1557	85
1538	1543	1548	1554	1559	1564	1569	1574	1579	1584	86
1565	1570	1575	1580	1586	1591	1596	1601	1607	1612	87
1591	1597	1602	1607	1613	1618	1623	1629	1634	1639	88
1618	1623	1629	1634	1640	1645	1650	1656	1661	1667	89
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0	1	2	3	4	5	6	7	8	9	F°

26 Zoll.

Quecksilber.

Gr. R.	0	1	2	3	4	5	6	7	8	9	10	11
	+	+	+	+	+	+	+	+	+	+	+	+
−14	0.99	0.99	0.99	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.02
13	92	92	92	0.93	0.93	0.93	0.93	0.94	0.94	0.94	0.95	0.95
12	85	85	85	85	86	86	86	87	87	87	87	88
11	78	78	78	78	79	79	79	79	80	80	80	80
10	70	71	71	71	71	72	72	72	72	73	73	73
9	63	64	64	64	64	64	65	65	65	65	65	66
8	56	57	57	57	57	57	57	58	58	58	58	58
7	49	49	50	50	50	50	50	50	51	51	51	51
6	42	42	43	43	43	43	43	43	43	43	44	44
5	35	35	35	36	36	36	36	36	36	36	36	36
4	28	28	28	28	28	29	29	29	29	29	29	29
3	21	21	21	21	21	21	22	22	22	22	22	22
2	14	14	14	14	14	14	14	14	14	15	15	15
− 1	07	07	07	07	07	07	07	07	07	07	07	07
	+	+	+	+	+	+	+	+	+	+	+	+
	−	−	−	−	−	−	−	−	−	−	−	−
+ 1	07	07	07	07	07	07	07	07	07	07	07	07
2	14	14	14	14	14	14	14	14	14	15	15	15
3	21	21	21	21	21	21	22	22	22	22	22	22
4	28	28	28	28	28	29	29	29	29	29	29	29
5	35	35	35	35	36	36	36	36	36	36	36	36
6	42	42	42	43	43	43	43	43	43	43	44	44
+ 7	49	49	49	50	50	50	50	50	50	51	51	51
	−	−	−	−	−	−	−	−	−	−	−	−

Messing.

	−	−	−	−	−	−	−	−	−	−	−	−
−14	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.21
12	18	18	18	19	19	19	19	19	19	19	19	19
10	17	17	17	17	17	17	17	17	17	17	17	17
8	15	15	16	16	16	16	16	16	16	16	16	16
6	14	14	14	14	14	14	14	14	14	14	14	14
− 4	13	13	13	13	13	13	13	13	13	13	13	13
2	11	11	11	11	11	11	11	11	11	11	11	11
1	10	10	10	10	10	10	11	11	11	11	11	11
0	10	10	10	10	10	10	10	10	10	10	10	10
+ 1	9	9	9	9	9	9	9	9	9	9	9	9
2	8	8	8	8	8	8	8	8	8	8	8	8
4	7	7	7	7	7	7	7	7	7	7	7	7
+ 6	5	5	5	5	5	5	5	5	5	5	5	5
	−	−	−	−	−	−	−	−	−	−	−	−

26 Zoll.

Quecksilber.

Gr. R.	0	1	2	3	4	5	6	7	8	9	10	11
	—	—	—	—	—	—	—	—	—	—	—	—
+ 7°	0.49	0.49	0.49	0.50	0.50	0.50	0.50	0.50	0.50	0.51	0.51	0.51
8	56	56	57	57	57	57	57	57	58	58	58	58
9	63	63	64	64	64	64	64	65	65	65	65	65
10	70	70	71	71	71	71	72	72	72	72	72	73
11	77	77	78	78	78	78	79	79	79	79	80	80
12	84	84	85	85	85	85	86	86	86	87	87	87
13	91	91	92	92	92	93	93	93	93	94	94	94
14	98	98	99	99	99	1.00	1.00	1.00	1.01	1.01	1.01	1.01
15	1.05	1.05	1.06	1.06	1.06	07	07	07	08	08	08	09
16	12	12	13	13	13	14	14	15	15	15	16	16
17	19	19	20	20	20	21	21	22	22	22	23	23
18	26	26	27	27	28	28	28	29	29	30	30	30
19	33	33	34	34	35	35	36	36	36	37	37	38
20	40	40	41	41	42	42	43	43	44	44	44	45
21	47	47	48	48	49	49	50	50	51	51	52	52
22	54	54	55	55	56	56	57	57	58	58	59	59
23	61	61	62	62	63	63	64	64	65	65	66	66
24	68	68	69	69	70	70	71	72	72	73	73	74
25	75	75	76	76	77	77	78	79	79	80	80	81
26	82	82	83	83	84	85	85	86	86	87	87	88
27	89	89	90	90	91	92	92	93	93	94	95	95
+28	96	96	97	97	98	99	89	2.00	2.00	2.01	2.02	2.02
	—	—	—	—	—	—	—	—	—	—	—	—

Messing.

	—	—	—	—	—	—	—	—	—	—	—	—
+ 6	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
8	04	04	04	04	04	04	04	04	04	04	04	04
10	02	02	02	02	02	02	02	02	02	02	02	02
12	01	01	01	01	01	01	01	01	01	01	01	01
	—	—	—	—	—	—	—	—	—	—	—	—
	+	+	+	+	+	+	+	+	+	+	+	+
14	01	01	01	01	01	01	01	01	01	01	01	01
16	02	02	02	02	02	02	02	02	02	02	02	02
18	04	04	04	04	04	04	04	04	04	04	04	04
20	05	05	05	05	05	05	05	05	05	05	05	05
22	07	07	07	07	07	07	07	07	07	07	07	07
24	08	08	08	08	08	08	08	08	08	08	08	08
26	10	10	10	10	10	10	10	10	10	10	10	10
+28	11	11	11	11	11	11	11	11	11	11	11	11
	+	+	+	+	+	+	+	+	+	+	+	+

27 Zoll.

Quecksilber.

Gr. R.	0	1	2	3	4	5	6	7	8	9	10	11
	+	+	+	+	+	+	+	+	+	+	+	+
—14	1.03	1.03	1.03	1.03	1.04	1.04	1.04	1.05	1.04	1.04	1.06	1.04
13	0.95	0.95	0.96	0.96	0.96	0.97	0.97	0.97	0.98	0.98	0.98	0.98
12	88	88	88	89	89	89	89	90	90	90	91	91
11	81	81	81	81	82	82	82	82	83	83	83	83
10	73	73	73	74	74	74	75	75	75	75	75	76
9	66	66	66	66	67	67	67	67	67	68	68	68
8	59	59	59	59	59	59	60	60	60	60	60	61
7	51	51	52	52	52	52	52	52	52	53	53	53
6	44	44	44	44	44	45	45	45	45	45	45	45
5	37	37	37	37	37	37	37	37	37	38	38	38
4	29	29	29	30	30	30	30	30	30	30	30	30
3	22	22	22	22	22	22	22	22	22	23	23	23
2	15	15	15	15	15	15	15	15	15	15	15	15
— 1	07	07	07	07	07	07	07	08	08	08	08	08
	+	+	+	+	+	+	+	+	+	+	+	+
	—	—	—	—	—	—	—	—	—	—	—	—
+ 1	07	07	07	07	07	07	07	08	08	08	08	08
2	15	15	15	15	15	15	15	15	15	15	15	15
3	22	22	22	22	22	22	22	22	22	23	23	23
4	29	29	29	29	30	30	30	30	30	30	30	30
5	36	37	37	37	37	37	37	37	37	38	38	38
6	44	44	44	44	44	44	45	45	45	45	45	45
+ 7	51	51	51	51	52	52	52	52	52	52	53	53
	—	—	—	—	—	—	—	—	—	—	—	—

Messing.

	—	—	—	—	—	—	—	—	—	—	—	—
—14	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
12	19	19	19	19	19	19	19	19	19	20	20	20
10	18	18	18	18	18	18	18	18	18	18	18	18
8	16	16	16	16	16	16	16	16	16	16	17	17
6	15	15	15	15	15	15	15	15	15	15	15	15
4	13	13	13	13	13	13	13	13	13	13	13	13
2	11	11	12	12	12	12	12	12	12	12	12	12
— 1	11	11	11	11	11	11	11	11	11	11	11	11
0	10	10	10	10	10	10	10	10	10	10	10	10
+ 1	09	09	09	09	09	09	09	09	09	09	09	09
2	08	08	08	08	09	09	09	09	09	09	09	09
4	07	07	07	07	07	07	07	07	07	07	07	07
+ 6	05	05	05	05	05	05	05	05	06	06	06	06
	—	—	—	—	—	—	—	—	—	—	—	—

27 Zoll.

Quecksilber.

Gr. R.	0	1	2	3	4	5	6	7	8	9	10	11
	—	—	—	—	—	—	—	—	—	—	—	—
+ 7°	0.51	0.51	0.51	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.53	0.53
8	58	59	59	59	59	59	59	60	60	60	60	60
9	66	66	66	66	66	67	67	67	67	67	68	68
10	73	73	73	74	74	74	74	74	75	75	75	75
11	80	80	81	81	81	81	82	82	82	82	83	83
12	87	88	88	88	88	89	89	89	90	90	90	90
13	95	95	96	96	96	96	96	97	97	97	98	98
14	1.02	1.02	1.03	1.03	1.03	1.03	1.04	1.04	1.04	1.05	1.05	1.05
15	09	09	10	10	10	11	11	11	12	12	13	13
16	16	17	17	17	18	18	19	19	19	20	20	20
17	24	24	24	25	25	26	26	26	27	27	27	28
18	31	31	32	32	32	33	33	34	34	35	35	35
19	38	39	39	39	40	40	41	41	42	42	42	43
20	45	46	46	47	47	48	48	48	49	49	50	50
21	53	53	54	54	54	55	55	56	56	57	57	58
22	60	60	61	61	62	62	63	63	64	64	65	65
23	67	68	68	69	69	70	70	71	71	72	72	73
24	74	75	75	76	76	77	77	78	79	79	80	80
25	81	82	83	83	84	84	85	85	86	87	87	88
26	89	89	90	90	91	92	92	93	93	94	94	95
27	96	96	97	98	98	99	2.00	2.00	2.01	2.01	2.02	2.03
+ 28	2.03	2.04	2.04	2.05	2.06	2.06	07	07	08	09	09	10
	—	—	—	—	—	—	—	—	—	—	—	—

Messing.

	—	—	—	—	—	—	—	—	—	—	—	—
+ 6	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06
8	04	04	04	04	04	04	04	05	05	05	05	05
10	02	02	02	02	02	02	02	02	02	02	02	02
12	01	01	01	01	01	01	01	01	01	01	01	01
	—	—	—	—	—	—	—	—	—	—	—	—
	+	+	+	+	+	+	+	+	+	+	+	+
14	01	01	01	01	01	01	01	01	01	01	01	01
16	02	02	02	02	02	02	02	02	02	02	02	02
18	04	04	04	04	04	04	04	04	04	04	04	04
20	05	05	05	05	05	05	05	05	06	06	06	06
22	07	07	07	07	07	07	07	07	07	07	07	07
24	08	08	08	08	08	09	09	09	09	09	09	09
26	10	10	10	10	10	10	10	10	10	10	10	10
+ 28	11	11	12	12	12	12	12	12	12	12	12	12
	+	+	+	+	+	+	+	+	+	+	+	+

29 Zoll.

Quecksilber.

Gr. R.	0	1	2	3	4	5	6	7	8	9	10	11
	+	+	+	+	+	+	+	+	+	+	+	+
—14	1.06	1.06	1.07	1.07	1.08	1.08	1.08	1.09	0.09	1.09	1.09	1.10
13	0.99	0.99	0.99	1.00	00	00	00	01	01	01	02	02
12	91	91	92	0.92	0.92	0.92	0.93	0.93	0.93	0.94	0.94	0.94
11	83	84	84	84	84	85	85	85	85	86	86	86
10	76	76	76	77	77	77	77	77	78	78	78	78
9	68	68	68	69	69	69	70	70	70	70	70	71
8	61	61	61	61	61	62	62	62	62	62	63	63
7	53	53	53	54	54	54	54	54	54	55	55	55
6	46	46	46	46	46	46	46	46	47	47	47	47
5	38	38	38	38	38	38	39	39	39	39	39	39
4	30	30	31	31	31	31	31	31	31	31	31	31
3	23	23	23	23	23	23	23	23	23	23	23	24
2	15	15	15	15	15	15	15	16	16	16	16	16
— 1	08	08	08	08	08	08	08	08	08	08	08	08
	+	+	+	+	+	+	+	+	+	+	+	+
	—	—	—	—	—	—	—	—	—	—	—	—
+ 1	08	08	08	08	08	08	08	08	08	08	08	08
2	15	15	15	15	15	15	15	15	16	16	16	16
3	23	23	23	23	23	23	23	23	23	23	23	23
4	30	30	30	31	31	31	31	31	31	31	31	31
5	38	38	38	38	38	38	39	39	39	39	39	39
6	45	46	46	46	46	46	46	46	46	47	47	47
+ 7	53	53	53	53	54	54	54	54	54	54	55	55
	—	—	—	—	—	—	—	—	—	—	—	—

Messing.

	—	—	—	—	—	—	—	—	—	—	—	—
—14	0.21	0.21	0.21	0.22	0.22	0.22	0.22	1.22	0.22	0.22	0.22	0.22
12	20	20	20	20	20	20	20	20	20	20	20	20
10	18	18	18	18	18	18	19	19	19	19	19	19
8	17	17	17	17	17	17	17	17	17	17	17	17
6	15	15	15	15	15	15	15	15	15	15	15	16
4	13	14	14	14	14	14	14	14	14	14	14	14
2	12	12	12	12	12	12	12	12	12	12	12	12
— 1	11	11	11	11	11	11	11	11	11	11	11	11
0	10	10	10	10	10	10	10	11	11	11	11	11
+ 1	10	10	10	10	10	10	10	10	10	10	10	10
2	09	09	09	09	09	09	09	09	09	09	09	09
4	07	07	07	07	07	07	07	07	07	07	07	07
+ 6	06	06	06	06	06	06	06	06	06	06	06	06
	—	—	—	—	—	—	—	—	—	—	—	—

28 Zoll.

Quecksilber.

Gr. R.	0	1	2	3	4	5	6	7	8	9	10	11
	—	—	—	—	—	—	—	—	—	—	—	—
+ 7°	0.53	0.53	0.53	0.53	0.54	0.54	0.54	0.54	0.54	0.54	0.55	0.55
8	60	61	61	61	61	61	62	62	62	62	62	62
9	69	69	69	69	69	69	69	70	70	70	70	70
10	76	76	76	76	76	77	77	77	77	78	78	78
11	84	84	84	84	84	84	85	85	85	85	86	86
12	91	91	91	91	92	92	92	93	93	93	93	94
13	99	99	99	99	99	1.00	1.00	1.00	1.00	1.01	1.01	1.01
14	1.06	1.06	1.06	1.07	1.07	07	08	08	08	08	09	09
15	14	14	14	14	15	15	15	16	16	16	17	17
16	21	21	21	22	22	22	23	23	24	24	24	25
17	29	29	29	29	30	30	30	31	31	32	32	32
18	36	36	36	37	37	38	38	39	39	39	40	40
19	43	44	44	44	45	40	46	46	47	47	47	48
20	51	52	52	52	53	53	53	54	54	55	55	56
21	58	59	59	60	60	61	61	62	62	62	63	63
22	66	66	67	67	67	68	69	69	70	70	71	71
23	73	74	74	75	75	76	76	77	77	78	78	79
24	81	81	82	82	83	83	84	84	85	86	86	87
25	88	89	89	90	90	91	92	92	93	93	94	94
26	96	96	97	97	98	99	99	2.00	2.00	2.01	2.01	2.02
27	2.03	2.04	2.04	2.05	2.06	2.06	2.07	07	08	09	09	10
+28	11	11	12	12	13	14	14	15	16	16	17	18
	—	—	—	—	—	—	—	—	—	—	—	—

Messing.

	—	—	—	—	—	—	—	—	—	—	—	—
+ 6	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
8	05	05	05	05	05	05	05	05	05	05	05	05
10	02	02	02	02	02	02	02	02	02	02	02	02
12	01	01	01	01	01	01	01	01	01	01	01	01
	—	—	—	—	—	—	—	—	—	—	—	—
	+	+	+	+	+	+	+	+	+	+	+	+
14	01	01	01	01	01	01	01	01	01	01	01	01
16	02	02	02	02	02	02	02	02	02	02	02	02
18	04	04	04	04	04	04	04	04	04	04	04	04
20	06	06	06	06	06	06	06	06	06	06	06	06
22	07	07	07	07	07	07	07	07	07	07	07	07
24	09	09	09	09	09	09	09	09	09	09	09	09
26	10	10	10	10	10	10	10	11	11	11	11	11
+28	12	12	12	12	12	12	12	12	12	12	12	12
	+	+	+	+	+	+	+	+	+	+	+	+

I. Pariser Zoll und Linien.

Pariser Z. u. Lin.	Millimeter.	Englische Zoll.
25Z oL	676.749	26.6441
1	679.005	26.7329
2	681.260	26.8218
3	683.516	26.9106
4	685.772	26.9994
5	688.028	27.0882
6	690.284	27.1770
7	692.540	27.2658
8	694.795	27.3546
9	697.051	27.4435
10	699.307	27.5323
11	701.563	27.6211
26 0	703.819	27.7099
1	706.074	27.7987
2	708.330	27.8875
3	710.586	27.9763
4	712.842	28.0652
5	715.098	28.1540
6	717.354	28.2428
7	719.609	28.3316
8	721.865	28.4204
9	724.121	28.5092
10	726.377	28.5980
11	728.633	28.6868
27 0	730.889	28.7757
1	733.144	28.8645
2	735.400	28.9533
3	737.656	29.0421
4	739.912	29.1309
5	742.168	29.2197
6	744.424	29.3085
7	746.679	29.3974
8	748.935	29.4862
9	751.191	29.5750
10	753.447	29.6638
11	755.703	29.7526
28 0	757.959	29.8414

Pariser Z. u. Lin.	Millimeter.	Englische Zoll.
28Z oL	757.959	29.8414
1	760.214	29.9302
2	762.470	30.0191
3	764.726	30.1079
4	766.982	30.1967
5	769.238	30.2855
6	771.494	30.3743
7	773.749	30.4631
8	776.005	30.5519
9	778.261	30.6408
10	780.517	30.7296
11	782.773	30.8184
29 0	785.029	30.9072

Pariser Linien.	Millimeter.	Englische Zoll.
0.1	0.226	0.0089
0.2	0.451	0.0178
0.3	0.677	0.0266
0.4	0.902	0.0355
0.5	1.128	0.0444
0.6	1.353	0.0533
0.7	1.579	0.0622
0.8	1.805	0.0711
0.9	2.030	0.0799
0.01	0.023	0.0009
0.02	0.045	0.0018
0.03	0.068	0.0027
0.04	0.090	0.0036
0.05	0.113	0.0044
0.06	0.135	0.0053
0.07	0.158	0.0062
0.08	0.180	0.0071
0.09	0.203	0.0080

1 Pariser Fuss = 12.7892 Engl. Zoll = 0.32484 Meter.

II. Englische Zoll.

Engl. Zoll.	Pariser Z. u. Lin.	Millimeter.	Engl. Zoll.	Pariser Z. u. Lin.	Millimeter.
26Z7	25Z0L629	678.168	30.0	28Z1L785	761.986
26.8	1.755	680.708	30.1	2.911	764.526
26.9	2.881	683.248	30.2	4.037	767.066
			30.3	5.163	769.606
27.0	4.007	685.788	30.4	6.289	772.146
27.1	5.133	688.328	30.5	7.415	774.686
27.2	6.259	690.868	30.6	8.541	777.226
27.3	7.385	693.407	30.7	9.667	779.766
27.4	8.511	695.947	30.8	10.793	782.306
27.5	9.637	698.487	30.9	11.919	784.846
27.6	10.763	701.027			
27.7	11.889	703.567	31.0	29 1.045	787.386
27.8	26 1.015	706.107			
27.9	2.140	708.647			
28.0	3.266	711.187			
28.1	4.392	713.727	Engl. Zoll.	Pariser Linien	Millimeter.
28.2	5.518	716.267			
28.3	6.644	718.807			
28.4	7.770	721.347	0.01	0.113	0.254
28.5	8.896	723.887	0.02	0.225	0.508
28.6	10.022	726.427	0.03	0.338	0.762
28.7	11.148	728.967	0.04	0.450	1.016
28.8	27 0.274	731.507	0.05	0.563	1.270
28.9	1.400	734.047	0.06	0.676	1.524
			0.07	0.788	1.778
29.0	2.526	736.587	0.08	0.901	2.032
29.1	3.652	739.127	0.09	1.013	2.286
29.2	4.778	741.667			
29.3	5.904	744.207	0.001	0.011	0.025
29.4	7.030	746.747	0.002	0.023	0.051
29.5	8.156	749.286	0.003	0.034	0.076
29.6	9.282	751.826	0.004	0.045	0.102
29.7	10.408	754.366	0.005	0.056	0.127
29.8	11.534	756.906	0.006	0.068	0.152
29.9	28 0.659	759.446	0.007	0.079	0.178
			0.008	0.090	0.203
30.0	1.785	761.986	0.009	0.101	0.229

12 Engl. Zoll = 135.114 Par. Linien = 0.30479 Meter.

III. Millimeter.

Millimeter.	Pariser Zoll u. Lin.	Englische Zoll.	Millimeter.	Pariser Zoll u. Lin.	Englische Zoll.
676	$24^{Z}\,11^{L}668$	26.6147	728	$26^{Z}\,10^{L}719$	28.6619
677	25 0.111	26.6540	729	11.163	28.7013
678	0.555	26.6934	730	11.606	28.7407
679	0.998	26.7328	731	27 0.049	28.7800
680	1.441	26.7721	732	0.493	28.8194
681	1.885	26.8115	733	0.936	28.8588
682	2.328	26.8509	734	1.379	28.8982
683	2.771	26.8902	735	1.823	28.9375
684	3.214	26.9296	736	2.266	28.9769
685	3.658	26.9690	737	2.709	29.0163
686	4.101	27.0084	738	3.152	29.0556
687	4.544	27.0477	739	3.596	29.0950
688	4.988	27.0871	740	4.039	29.1344
689	5.431	27.1265	741	4.482	29.1738
690	5.874	27.1658	742	4.926	29.2131
691	6.318	27.2052	743	5.369	29.2525
692	6.761	27.2446	744	5.812	29.2919
693	7.204	27.2840	745	6.256	29.3312
694	7.647	27.3233	746	6.699	29.3706
695	8.091	27.3627	747	7.142	29.4100
696	8.534	27.4021	748	7.585	29.4494
697	8.977	27.4414	749	8.029	29.4887
698	9.421	27.4808	750	8.472	29.5281
699	9.864	27.5202	751	8.915	29.5675
700	10.307	27.5596	752	9.359	29.6068
701	10.750	27.5989	753	9.802	29.6462
702	11.194	27.6383	754	10.245	29.6856
703	11.637	27.6777	755	10.688	29.7249
704	26 0.080	27.7170	756	11.132	29.7643
705	0.524	27.7564	757	11.575	29.8037
706	0.967	27.7958	758	28 0.018	29.8431
707	1.410	27.8351	759	0.462	29.8824
708	1.854	27.8745	760	0.905	29.9218
709	2.297	27.9139	761	1.348	29.9612
710	2.740	27.9533	762	1.792	30.0005
711	3.183	27.9926	763	2.235	30.0399
712	3.627	28.0320	764	2.678	30.0793
713	4.070	28.0714	765	3.121	30.1187
714	4.513	28.1107	766	3.565	30.1580
715	4.957	28.1501	767	4.008	30.1974
716	5.400	28.1895	768	4.451	30.2368
717	5.843	28.2289	769	4.895	30.2761
718	6.287	28.2682	770	5.338	30.3155
719	6.730	28.3076	771	5.781	30.3549
720	7.173	28.3470	772	6.225	30.3942
721	7.616	28.3863	773	6.668	30.4336
722	8.060	28.4257	774	7.111	30.4730
723	8.503	28.4651	775	7.554	30.5124
724	8.946	28.5045	776	7.998	30.5517
725	9.390	28.5438	777	8.441	30.5911
726	9.833	28.5832	778	8.884	30.6305
727	10.276	28.6226	779	9.328	30.6698
			780	9.771	30.7092

Millimeter.	Pariser Linien.	Englische Zoll.	Millimeter.	Pariser Linien.	Englische Zoll.
0.1	0.044	0.0039	0.01	0.004	0.0004
0.2	0.089	0.0079	0.02	0.009	0.0008
0.3	0.133	0.0118	0.03	0.013	0.0012
0.4	0.177	0.0157	0.04	0.018	0.0016
0.5	0.222	0.0197	0.05	0.022	0.0020
0.6	0.266	0.0236	0.06	0.027	0.0024
0.7	0.310	0.0276	0.07	0.031	0.0028
0.8	0.355	0.0315	0.08	0.035	0.0031
0.9	0.399	0.0354	0.09	0.040	0.0035

1 Meter = 33.3708 Engl. Zoll.
= 443.296 Paris. Linien.

Verwandlung der Thermometerscalen.

C.	R.	F.	C.	R.	F.	C.	R.	F.	C.	R.	F.
—	—	—	—	—	+	+	+	+	+	+	+
35°0	28°0	31°0	17°5	14°0	0°5	0°0	0°0	32°0	17°5	14°0	63°5
34.5	27.6	30.1	17.0	13.6	1.4	0.5	0.4	32.9	18.0	14.4	64.4
34.0	27.2	29.2	16.5	13.2	2.3	1.0	0.8	33.8	18.5	14.8	65.3
33.5	26.8	28.3	16.0	12.8	3.2	1.5	1.2	34.7	19.0	15.2	66.2
33.0	26.4	27.4	15.5	12.4	4.1	2.0	1.6	35.6	19.5	15.6	67.1
32.5	26.0	26.5	15.0	12.0	5.0	2.5	2.0	36.5	20.0	16.0	68.0
32.0	25.6	25.6	14.5	11.6	5.9	3.0	2.4	37.4	20.5	16.4	68.9
31.5	25.2	24.7	14.0	11.2	6.8	3.5	2.8	38.3	21.0	16.8	69.8
31.0	24.8	23.8	13.5	10.8	7.7	4.0	3.2	39.2	21.5	17.2	70.7
30.5	24.4	22.9	13.0	10.4	8.6	4.5	3.6	40.1	22.0	17.6	71.6
30.0	24.0	22.0	12.5	10.0	9.5	5.0	4.0	41.0	22.5	18.0	72.5
29.5	23.6	21.1	12.0	9.6	10.4	5.5	4.4	41.9	23.0	18.4	73.4
29.0	23.2	20.2	11.5	9.2	11.3	6.0	4.8	42.8	23.5	18.8	74.3
28.5	22.8	19.3	11.0	8.8	12.2	6.5	5.2	43.7	24.0	19.2	75.2
28.0	22.4	18.4	10.5	8.4	13.1	7.0	5.6	44.6	24.5	19.6	76.1
27.5	22.0	17.5	10.0	8.0	14.0	7.5	6.0	45.5	25.0	20.0	77.0
27.0	21.6	16.6	9.5	7.6	14.9	8.0	6.4	46.4	25.5	20.4	77.9
26.5	21.2	15.7	9.0	7.2	15.8	8.5	6.8	47.3	26.0	20.8	78.8
26.0	20.8	14.8	8.5	6.8	16.7	9.0	7.2	48.2	26.5	21.2	79.7
25.5	20.4	13.9	8.0	6.4	17.6	9.5	7.6	49.1	27.0	21.6	80.6
25.0	20.0	13.0	7.5	6.0	18.5	10.0	8.0	50.0	27.5	22.0	81.5
24.5	19.6	12.1	7.0	5.6	19.4	10.5	8.4	50.9	28.0	22.4	82.4
24 0	19.2	11.2	6.5	5.2	20.3	11.0	8.8	51.8	28.5	22.8	83.3
23.5	18.8	10.3	6.0	4.8	21.2	11.5	9.2	52.7	29.0	23.2	84.2
23.0	18.4	9.4	5.5	4.4	22.1	12.0	9.6	53.6	29.5	23.6	85.1
22.5	18.0	8.5	5.0	4.0	23.0	12.5	10.0	54.5	30.0	24.0	86.0
22.0	17.6	7.6	4.5	3.6	23.9	13.0	10.4	55.4	30.5	24.4	86.9
21.5	17.2	6.7	4.0	3.2	24.8	13.5	10.8	56.3	31.0	24.8	87.8
21.0	16.8	5.8	3.5	2.8	25.7	14.0	11.2	57.2	31.5	25.2	88.7
20.5	16.4	4.9	3.0	2.4	26.6	14.5	11.6	58.1	32.0	25.6	89.6
20.0	16.0	4.0	2.5	2.0	27.5	15.0	12.0	59.0	32.5	26.0	90.5
19.5	15.6	3.1	2.0	1.6	28.4	15.5	12.4	59.9	33.0	26.4	91.4
19.0	15.2	2.2	1.5	1.2	29.3	16.0	12.8	60.8	33.5	26.8	92.3
18.5	14.8	1.3	1.0	0.8	30.2	16.5	13.2	61.7	34.0	27.2	93.2
18.0	14.4	0.4	0.5	0.4	31.1	17.0	13.6	62.6	34.5	27.6	94.1

Decimaltheile der Scalen.

Réaumur.			Celsius.			Fahrenheit.		
R.	C.	F.	C.	R.	F.	F.	R.	C.
0°10	0°13	0°23	0°10	0°08	0°18	0°10	0°04	0°06
0.20	0.25	0.45	0.20	0.16	0.36	0.20	0.09	0.11
0.30	0.38	0.68	0.30	0.24	0.54	0.30	0.13	0.17
0.40	0.50	0.90	0.40	0.32	0.72	0.40	0.18	0.22
0.50	0.63	1.13	0.50	0.40	0.90	0.50	0.22	0.28
0.60	0.76	1.36	0.60	0.48	1.08	0.60	0.27	0.33
0.70	0.88	1.58	0.70	0.56	1.26	0.70	0.31	0.39
0.80	1.00	1.80	0.80	0.64	1.44	0.80	0.36	0.44
0.90	1.14	2.03	0.90	0.72	1.62	0.90	0.40	0.50

Réaumur.			Celsius.			Fahrenheit.		
R.	C.	F.	C.	R.	F.	F.	R.	C.
0°01	0°01	0°02	0°01	0°01	0°02	0°01	0°00	0°01
0.02	0.03	0.05	0.02	0.02	0.04	0.02	0.01	0.01
0.03	0.04	0.07	0.03	0.02	0.05	0.03	0.01	0.02
0.04	0.05	0.09	0.04	0.03	0.07	0.04	0.02	0.02
0.05	0.06	0.11	0.05	0.04	0.09	0.05	0.02	0.03
0.06	0.08	0.14	0.06	0.05	0.11	0.06	0.03	0.03
0.07	0.09	0.16	0.07	0.06	0.13	0.07	0.03	0.04
0.08	0.10	0.18	0.08	0.06	0.14	0.08	0.04	0.04
0.09	0.11	0.20	0.09	0.07	0.16	0.09	0.04	0.05

II.

FORMELN.

Goniometrische Formeln.

$\sin a^2 + \cos a^2 = 1$

$\sec a^2 - \operatorname{tg} a^2 = 1$ oder $\sec a^2 = 1 + \operatorname{tg} a^2$

$\operatorname{cosec} a^2 - \operatorname{cotg} a^2 = 1$ $\quad \operatorname{cosec} a^2 = 1 + \operatorname{cotg} a^2$

$\sin a \operatorname{cosec} a = 1$ $\quad \operatorname{cosec} a = \frac{1}{\sin a}$

$\cos a \sec a = 1$ $\quad \sec a = \frac{1}{\cos a}$

$\operatorname{tg} a \operatorname{cotg} a = 1$ $\quad \operatorname{cotg} a = \frac{1}{\operatorname{tg} a}$

$$\operatorname{tg} a = \frac{\sin a}{\cos a} = \frac{\sec a}{\operatorname{cosec} a} = \operatorname{cosec} 2a - \operatorname{cotg} 2a$$

$$\operatorname{cotg} a = \frac{\cos a}{\sin a} = \frac{\operatorname{cosec} a}{\sec a} = \operatorname{cosec} 2a + \operatorname{cotg} 2a$$

Werthe und Zeichen der trigonometrischen Functionen für Winkel und Bögen, die $> 90°$.

a sei $< 90°$, so ist für A, das einen Winkel grösser als $90°$ bedeutet,

	wenn A $= 90° + a$	wenn A $= 180° + a$	wenn A $= 270° + a$
sin A	+ cos a	− sin a	− cos a
cos A	− sin a	− cos a	+ sin a
tg A	− cotg a	+ tg a	− cotg a
cotg A	− tg a	+ cotg a	− tg a
sec A	− cosec a	− sec a	+ cosec a
cosec A	+ sec a	− cosec a	− sec a

$$\sin a = \cos a \operatorname{tg} a = \sqrt{1 - \cos a^2}$$

$$= \frac{\operatorname{tg} a}{\sqrt{1 + \operatorname{tg} a^2}} = 2 \sin \frac{a}{2} \cos \frac{a}{2} = 3 \sin \frac{a}{3} - 4 \left(\sin \frac{a}{3}\right)^3$$

$$= \frac{1}{\sqrt{1 + \operatorname{cotg} a^2}}$$

$$= \cos b \sin (a + b) - \sin b \cos (a + b)$$

$$\cos a = 1 - 2\sin\tfrac{1}{2}a^2 = \sqrt{1-\sin a^2}\ \ 2\cos\tfrac{1}{2}a^2 - 1$$
$$= \cos\tfrac{1}{2}a^2 - \sin\tfrac{1}{2}a^2$$
$$= \cos b\,\cos(a+b) + \sin b\,\sin(a+b)$$
$$= \frac{1}{\sqrt{1+\operatorname{tg} a^2}} = \frac{\operatorname{cotg} a}{\sqrt{1+\operatorname{cotg} a^2}}$$

$$\operatorname{tg} a = \frac{\operatorname{tg}(a+b)-\operatorname{tg} b}{1+\operatorname{tg} b\,\operatorname{tg}(a+b)} = \frac{\sin a}{\sqrt{1-\sin a^2}} = \frac{\sqrt{1-\cos a^2}}{\cos a}$$

$$\sin(a+b) = \sin a\cos b + \cos a\sin b$$
$$\sin(a-b) = \sin a\cos b - \cos a\sin b$$
$$\cos(a+b) = \cos a\cos b - \sin a\sin b$$
$$\cos(a-b) = \cos a\cos b + \sin a\sin b$$

$$\operatorname{tg}(a+b) = \frac{\operatorname{tg} a + \operatorname{tg} b}{1-\operatorname{tg} a\operatorname{tg} b}$$

$$\operatorname{tg}(a-b) = \frac{\operatorname{tg} a - \operatorname{tg} b}{1+\operatorname{tg} a\operatorname{tg} b}$$

$$\operatorname{cotg}(a+b) = \frac{\operatorname{cotg} a\operatorname{cotg} b - 1}{\operatorname{cotg} a + \operatorname{cotg} b}$$

$$\operatorname{cotg}(a-b) = \frac{\operatorname{cotg} a\operatorname{cotg} b + 1}{\operatorname{cotg} b - \operatorname{cotg} a}$$

$$\sin a\sin b = \tfrac{1}{2}\cos(a-b) - \tfrac{1}{2}\cos(a+b)$$
$$\sin a\cos b = \tfrac{1}{2}\sin(a+b) + \tfrac{1}{2}\sin(a-b)$$
$$\cos a\sin b = \tfrac{1}{2}\sin(a+b) - \tfrac{1}{2}\sin(a-b)$$
$$\cos a\cos b = \tfrac{1}{2}\cos(a+b) + \tfrac{1}{2}\cos(a-b)$$

$$\operatorname{tg} a\ \operatorname{tg} b = \frac{\cos(a-b)-\cos(a+b)}{\cos(a-b)+\cos(a+b)} = \frac{\operatorname{tg} a + \operatorname{tg} b}{\operatorname{cotg} a + \operatorname{cotg} b}$$

$$\operatorname{tg} a\operatorname{cotg} b = \frac{\sin(a+b)+\sin(a-b)}{\sin(a+b)-\sin(a-b)} = \frac{\operatorname{tg} a + \operatorname{cotg} b}{\operatorname{cotg} a + \operatorname{tg} b}$$

$$\operatorname{cotg} a\ \operatorname{tg} b = \frac{\sin(a+b)-\sin(a-b)}{\sin(a+b)+\sin(a-b)} = \frac{\operatorname{cotg} a + \operatorname{tg} b}{\operatorname{tg} a + \operatorname{cotg} b}$$

$$\operatorname{cotg} a\ \operatorname{cotg} b = \frac{\cos(a-b)+\cos(a+b)}{\cos(a-b)-\cos(a+b)} = \frac{\operatorname{cotg} a + \operatorname{cotg} b}{\operatorname{tg} a + \operatorname{tg} b}$$

$$\sin a + \sin b = 2\sin\tfrac{1}{2}(a+b)\cos\tfrac{1}{2}(a-b)$$
$$\sin a - \sin b = 2\sin\tfrac{1}{2}(a-b)\cos\tfrac{1}{2}(a+b)$$
$$\cos a + \cos b = 2\cos\tfrac{1}{2}(a+b)\cos\tfrac{1}{2}(a-b)$$
$$\cos a - \cos b = -2\sin\tfrac{1}{2}(a+b)\sin\tfrac{1}{2}(a-b)$$

$$\operatorname{tg} a + \operatorname{tg} b = \frac{\sin(a+b)}{\cos a \cos b}$$
$$\operatorname{tg} a - \operatorname{tg} b = \frac{\sin(a-b)}{\cos a \cos b}$$
$$\operatorname{cotg} a + \operatorname{cotg} b = \frac{\sin(a+b)}{\sin a \sin b}$$
$$\operatorname{cotg} a - \operatorname{cotg} b = -\frac{\sin(a-b)}{\sin a \sin b}$$

$$\sin a + \cos a = \cos(a - 45^\circ)\sqrt{2}$$
$$\sin a - \cos a = \sin(a - 45^\circ)\sqrt{2}$$

$$\operatorname{tg} \tfrac{1}{2}(a+b) = \frac{\sin a + \sin b}{\cos a + \cos b}$$
$$\operatorname{tg} \tfrac{1}{2}(a-b) = \frac{\sin a - \sin b}{\cos a + \cos b}$$
$$\operatorname{cotg} \tfrac{1}{2}(a+b) = \frac{\sin a - \sin b}{\cos b - \cos a}$$
$$\operatorname{cotg} \tfrac{1}{2}(a-b) = \frac{\sin a + \sin b}{\cos b - \cos a}$$

$$\sin(45^\circ + a) = (\cos a + \sin a)\sqrt{\tfrac{1}{2}} = \sqrt{\tfrac{1}{2}}(1 + \sin 2a)$$
$$\sin(45^\circ - a) = (\cos a - \sin a)\sqrt{\tfrac{1}{2}} = \sqrt{\tfrac{1}{2}}(1 - \sin 2a)$$
$$\cos(45^\circ + a) = (\cos a - \sin a)\sqrt{\tfrac{1}{2}} = \sqrt{\tfrac{1}{2}}(1 - \sin 2a)$$
$$\cos(45^\circ - a) = (\cos a + \sin a)\sqrt{\tfrac{1}{2}} = \sqrt{\tfrac{1}{2}}(1 + \sin 2a)$$

$$\operatorname{tg}(45^\circ + a) = \frac{1 + \operatorname{tg} a}{1 - \operatorname{tg} a} = \frac{\cos a + \sin a}{\cos a - \sin a}$$
$$= \sqrt{\frac{1 + \sin 2a}{1 - \sin 2a}} = \frac{1 + \sin 2a}{\cos 2a} = \frac{\cos 2a}{1 - \sin 2a}$$
$$= \sec 2a + \operatorname{tg} 2a$$

$$\operatorname{tg}(45^\circ - a) = \frac{1 - \operatorname{tg} a}{1 + \operatorname{tg} a} = \frac{\cos a - \sin a}{\cos a + \sin a}$$
$$= \sqrt{\frac{1 - \sin 2a}{1 + \sin 2a}} = \frac{1 - \sin 2a}{\cos 2a} = \frac{\cos 2a}{1 + \sin 2a}$$
$$= \sec 2a - \operatorname{tg} 2a$$

$$\sin a^2 - \sin b^2 = \sin(a+b)\sin(a-b)$$
$$\cos a^2 - \sin b^2 = \cos(a+b)\cos(a-b)$$

$$\sin \tfrac{1}{2}a = \tfrac{1}{2}\sqrt{1 + \sin a} - \tfrac{1}{2}\sqrt{1 - \sin a} = \sqrt{\frac{1 - \cos a}{2}}$$

$$\cos \tfrac{1}{2}a = \tfrac{1}{2}\sqrt{1 + \sin a} + \tfrac{1}{2}\sqrt{1 - \sin a} = \sqrt{\frac{1 + \cos a}{2}}$$

$$\operatorname{tg}\tfrac{1}{2}a = \sqrt{\frac{1-\cos a}{1+\cos a}} = \frac{\sin a}{1+\cos a} = \frac{1-\cos a}{\sin a}$$

$$\operatorname{cotg}\tfrac{1}{2}a = \sqrt{\frac{1+\cos a}{1-\cos a}} = \frac{1+\cos a}{\sin a} = \frac{\sin a}{1-\cos a}$$

$$\sin 2a = 2\sin a\cos a = \frac{2\operatorname{tg} a}{1+\operatorname{tg} a^2} = \frac{1}{\frac{1}{2}\operatorname{tg} a + \frac{1}{2}\operatorname{cotg} a}$$

$$\cos 2a = \cos a^2 - \sin a^2 = \cos a^4 - \sin a^4 = 2\cos a^2 - 1$$
$$= 1 - 2\sin a^2 = \frac{1-\operatorname{tg} a^2}{1+\operatorname{tg} a^2} = \frac{\operatorname{cotg} a - \operatorname{tg} a}{\operatorname{cotg} a + \operatorname{tg} a}$$

$$\operatorname{tg} 2a = \frac{2\operatorname{tg} a}{1-\operatorname{tg} a^2} = \frac{2}{\operatorname{cotg} a - \operatorname{tg} a}$$
$$= \tfrac{1}{2}\operatorname{tg}(45^\circ + a) - \tfrac{1}{2}\operatorname{tg}(45^\circ - a)$$

$$\operatorname{cotg} 2a = \frac{\operatorname{cotg} a^2 - 1}{2\operatorname{cotg} a} = \tfrac{1}{2}\operatorname{cotg} a - \tfrac{1}{2}\operatorname{tg} a$$

$$\sec 2a = \frac{\operatorname{cotg} a + \operatorname{tg} a}{\operatorname{cotg} a - \operatorname{tg} a} = \tfrac{1}{2}\operatorname{tg}(45^\circ + a) + \tfrac{1}{2}\operatorname{tg}(45^\circ - a)$$

$$\operatorname{cosec} 2a = \tfrac{1}{2}\operatorname{cotg} a + \tfrac{1}{2}\operatorname{tg} a = \operatorname{tg} a + \operatorname{cotg} 2a$$
$$= \operatorname{cotg} a - \operatorname{cotg} 2a$$

$$1 + \sin 2a = (\sin a + \cos a)^2$$
$$1 - \sin 2a = (\sin a - \cos a)^2$$
$$1 + \cos 2a = 2\cos a^2$$
$$1 - \cos 2a = 2\sin a^2$$
$$1 - \sec 2a = -\operatorname{tg} a \operatorname{tg} 2a$$
$$1 - \operatorname{cosec} 2a = -\operatorname{cotg}(45^\circ + a)\operatorname{cotg} 2a.$$

Trigonometrische Formeln.

In den nachstehenden Gleichungen bezeichnen a, b, c die Seiten, A, B, C die denselben gegenüberliegenden Winkel eines Dreiecks.

1. Das rechtwinklige ebene Dreieck. ($C = 90^\circ$.)

Gegeben	Gesucht	Formel.
a, b	A, B, c	$\operatorname{tg} A = \frac{a}{b} = \operatorname{cotg} B$; $c = \frac{a}{\sin A} = \frac{b}{\cos A} = \sqrt{a^2+b^2}$.
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B$; $b = a \operatorname{cotg} A = c \cos A = \sqrt{c^2-a^2}$.
c, A	a, b	$a = c \sin A$; $b = c \cos A$.
a, A	b, c	$b = a \operatorname{cotg} A$; $c = \frac{a}{\sin A}$.

2. Das schiefwinklige ebene Dreieck.

a, b, c	A	Es wird gesetzt: $s = \frac{a+b+c}{2}$; $\operatorname{tg} \frac{1}{2} A = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$
a, b, C	A, B, c	$c \sin \frac{1}{2}(A-B) = (a-b) \sin \frac{1}{2}(A+B)$; $c \cos \frac{1}{2}(A-B) = (a+b) \cos \frac{1}{2}(A+B)$; $\frac{1}{2}(A+B) = 90^\circ - \frac{1}{2} C$.
a, b, A	B, c, C	$\sin B = \frac{b \sin A}{a}$; $c = \frac{a \sin (A+B)}{\sin A} = \frac{a \sin C}{\sin A}$; $C = 180^\circ - (A+B)$.
a, A, B, C	b, c	$b = \frac{a \sin B}{\sin A}$; $c = \frac{a \sin (A+B)}{\sin A}$.

3. Das rechtwinklige sphärische Dreieck. ($C = 90^\circ$.)

a, b	A, B, c	$\operatorname{cotg} A = \operatorname{cotg} a \sin b$; $\operatorname{cotg} B = \operatorname{cotg} b \sin a$; $\cos c = \cos a \cos b$.
a, c	A, B, b	$\sin A = \frac{\sin a}{\sin c}$; $\cos B = \operatorname{tg} a \operatorname{cotg} c$; $\cos b = \frac{\cos c}{\cos a}$.
a, A	B, b, c	$\sin B = \frac{\cos A}{\cos a}$; $\sin b = \operatorname{tg} a \operatorname{cotg} A$; $\sin c = \frac{\sin a}{\sin A}$.
a, B	A, b, c	$\cos A = \cos a \sin B$; $\operatorname{tg} b = \operatorname{tg} B \sin a$; $\operatorname{cotg} c = \operatorname{cotg} a \cos B$.
c, A	a, b, B	$\sin a = \sin c \sin A$; $\operatorname{tg} b = \operatorname{tg} c \cos A$; $\operatorname{cotg} B = \cos c \operatorname{tg} A$.
A, B	a, b, c	$\cos a = \frac{\cos A}{\sin B}$; $\cos b = \frac{\cos B}{\sin A}$; $\cos c = \operatorname{cotg} A \operatorname{cotg} B$.

4. Das rechtseitige sphärische Dreieck. ($c = 90^\circ$.)

Gegeben	Gesucht	Formel.
A, B	a, b, C	$\operatorname{cotg} a = \operatorname{cotg} A \sin B$; $\operatorname{cotg} b = \operatorname{cotg} B \sin A$; $\cos C = -\cos A \cos B$.
A, C	a, b, B	$\sin a = \frac{\sin A}{\sin C}$; $\cos b = -\operatorname{tg} A \operatorname{cotg} C$; $\cos B = -\frac{\cos C}{\cos A}$.
A, a	b, B, C	$\sin b = \frac{\cos a}{\cos A}$; $\sin B = \operatorname{tg} A \operatorname{cotg} a$; $\sin C = \frac{\sin A}{\sin a}$.
A, b	a, B, C	$\cos a = \cos A \sin b$; $\operatorname{tg} B = -\operatorname{tg} b \sin A$; $\operatorname{cotg} C = -\operatorname{cotg} A \cos b$.
C, a	A, B, b	$\sin A = \sin C \sin a$; $\operatorname{tg} B = -\operatorname{tg} C \cos a$; $\operatorname{cotg} b = -\cos C \operatorname{tg} a$.
a, b	A, B, C	$\cos A = \frac{\cos a}{\sin b}$; $\cos B = \frac{\cos b}{\sin a}$; $\cos C = -\operatorname{cotg} a \operatorname{cotg} b$.

5. Das schiefwinklige sphärische Dreieck.

a, b, c	A	Es wird gesetzt: $s = \frac{a+b+c}{2}$ $\operatorname{tg} \frac{1}{2} A = \sqrt{\frac{\sin(s-b)\sin(s-c)}{\sin s \sin(s-a)}}$
a, b, C	A, c	1) $\cos c = \cos a \cos b + \sin a \sin b \cos C$. $\sin c \sin A = \sin a \sin C$. $\sin c \cos A = \cos a \sin b - \sin a \cos b \cos C$. 2) Man setzt: $\sin a \cos C = m \sin M$, $\cos a = m \cos M$, so wird: $\cos c = m \cos(b - M)$; $\sin c \sin A = \sin a \sin C$; $\sin c \cos A = m \sin(b - M)$. 3) $\sin \frac{1}{2} c \sin \frac{1}{2}(A-B) = \cos \frac{1}{2} C \sin \frac{1}{2}(a-b)$; $\sin \frac{1}{2} c \cos \frac{1}{2}(A-B) = \sin \frac{1}{2} C \sin \frac{1}{2}(a+b)$; $\cos \frac{1}{2} c \sin \frac{1}{2}(A+B) = \cos \frac{1}{2} C \cos \frac{1}{2}(a-b)$; $\cos \frac{1}{2} c \cos \frac{1}{2}(A+B) = \sin \frac{1}{2} C \cos \frac{1}{2}(a+b)$.

Gegeben	Gesucht	Formel.
A, B, c	a, C	1) $\sin C \sin a = \sin A \sin c$; $\sin C \cos a = \cos A \sin B + \sin A \cos B \cos c$; $\cos C = -\cos A \cos B + \sin A \sin B \cos c$. 2) $\sin \frac{1}{2} C \sin \frac{1}{2}(a+b) = \sin \frac{1}{2} c \cos \frac{1}{2}(A-B)$; $\sin \frac{1}{2} C \cos \frac{1}{2}(a+b) = \cos \frac{1}{2} c \cos \frac{1}{2}(A+B)$; $\cos \frac{1}{2} C \sin \frac{1}{2}(a-b) = \sin \frac{1}{2} c \sin \frac{1}{2}(A-B)$; $\cos \frac{1}{2} C \cos \frac{1}{2}(a-b) = \cos \frac{1}{2} c \sin \frac{1}{2}(A+B)$.
a, b, A	B, C, c	$\sin B = \frac{\sin b \sin A}{\sin a}$ $\operatorname{tg} \frac{1}{2} C = \frac{\cos \frac{1}{2}(a-b)}{\cos \frac{1}{2}(a+b)} \operatorname{cotg} \frac{1}{2}(A+B)$ $= \frac{\sin \frac{1}{2}(a-b)}{\sin \frac{1}{2}(a+b)} \operatorname{cotg} \frac{1}{2}(A-B)$; $\operatorname{tg} \frac{1}{2} c = \frac{\cos \frac{1}{2}(A+B)}{\cos \frac{1}{2}(A-B)} \operatorname{tg} \frac{1}{2}(a+b)$ $= \frac{\sin \frac{1}{2}(A+B)}{\sin \frac{1}{2}(A-B)} \operatorname{tg} \frac{1}{2}(a-b)$.
A, B, a	b, c, C	$\sin b = \frac{\sin B \sin a}{\sin A}$. $\operatorname{tg} \frac{1}{2} C$ und $\operatorname{tg} \frac{1}{2} c$ wie oben.
A, B, C	a	Man setzt: $s = \frac{A+B+C}{2}$ $\operatorname{tg} \frac{1}{2} a = \sqrt{-\frac{\cos s \cos(s-A)}{\cos(s-B) \cos(s-C)}}$.

Astronomische Reductions-Formeln.

Passagen-Instrument im Meridian.

Zeitbestimmung.

Bezeichnet:

U den Uhrstand zur Zeit der Beobachtung;

ΔU den Uhrfehler;

α das Azimuth des Instruments, von Süden nach Osten gerechnet;

i die um Ungleichheit der Dicke der Zapfen corrigirte Neigung der Achse, positiv, wenn West höher;

c den Collimationsfehler des Fernrohres, bei der Oberen Culmination +, wenn die Gesichtslinie des Fernrohrs östlich,
bei der Unteren Culmination +, wenn sie westlich vom Meridian gerichtet ist;

α, i und c in Zeitsecunden ausgedrückt;

φ die Polhöhe des Beobachtungsortes;

δ die Declination des beobachteten Sternes; ist ferner

$n = i \sin\varphi - \alpha \cos\varphi$,

$m = i \cos\varphi + \alpha \sin\varphi$, so ist

Zeit der wahren Culmination

T. Mayer'sche Formel.
$$= U + \Delta U + \alpha \frac{\sin(\varphi-\delta)}{\cos\delta} + i \frac{\cos(\varphi-\delta)}{\cos\delta} + c \sec\delta,$$

oder

Bessel'sche Formel.
$$= U + \Delta U + m + n \operatorname{tg}\delta + c \sec\delta,$$

oder

Hansen'sche Formel.
$$= U + \Delta U + i \sec\varphi + n (\operatorname{tg}\delta - \operatorname{tg}\varphi) + c \sec\delta.$$

Faden-distanzen.

Es bezeichne

F die Distanz eines Seitenfadens vom Mittelfaden für Sterne im Aequator (in Zeit);

τ die Zeit, die ein Stern gebraucht, um die Distanz eines Seitenfadens vom Mittelfaden scheinbar zu durchlaufen, und es sei

$\log \alpha = 0.9451 - 10.$

F wird gefunden aus dem Durchgange eines nördlichen Sternes durch alle Fäden vermittelst der Formel

$$F = \tau \cos\delta - \alpha \tau^3 \cos\delta;$$

dagegen werden bei Beobachtung irgend eines Sternes die Durchgänge durch die Seitenfäden auf den Mittelfaden reducirt durch:

$$\tau = F \sec\delta + \alpha F^3 \sec\delta^3.$$

Tägliche Aberration.

Die beobachtete Zeit einer Sternculmination ist zu corrigiren um die tägliche Aberration; die Formel datür ist:

$$-0^s.0207\ \varrho \cos\psi \sec\delta,$$

wo ψ die geocentrische Breite, ϱ den Radius Vector bedeutet.

Ungleichheit der Dicke der Zapfen.

Ist

J die gesuchte Neigung der Achse bei Lage I.,
J' bei Lage II. des Instrumentes,
N die Neigung, wie das Niveau sie bei Lage I.,
N' wie es sie bei Lage II. angiebt,
l der Winkel der Lagerflächen,
n der Winkel der Niveaufüsse,
$u = N - N'$, so ist

$$J = N - \frac{u}{2\left(\frac{\sin\frac{1}{2}n}{\sin\frac{1}{2}l} + 1\right)}$$

$$J' = N' + \frac{u}{2\left(\frac{\sin\frac{1}{2}n}{\sin\frac{1}{2}l} + 1\right)}$$

Passagen-Instrument im Verticale des Polarsterns.

Zeitbestimmung.

Bezeichnet

Für den Polarstern	Für den Zeitstern	
S'	S	die Uhrzeit der Beobachtung,
$u+\gamma$	u	die Correction gegen Sternzeit,
α'	α	die scheinbare AR,
δ'	δ	die scheinbare Declination,
z'	z	die Zenithdistanz, z' immer positiv, $z = \varphi - \delta$,

so wird

$$S'+\gamma-\alpha'=D' \quad \operatorname{tg}\delta\operatorname{cotg}\delta'=\lambda \quad \operatorname{tg} x_0=\frac{\lambda\sin\tau}{1-\lambda\cos\tau}$$
$$S-\alpha=D$$
$$15(D'-D)=\tau \quad \operatorname{tg}\varphi\operatorname{cotg}\delta=\mu \quad \sin m_0=\mu\sin x_0$$

und daraus

$$u+Bb+Cc+Ff=\frac{x_0 \mp m_0}{15}-D$$

worin noch ist:

$B = \sec\varphi$ — b die Neigung der Achse, positiv, wenn West höher,

$C = \sec\varphi\,\frac{\sin z'+\sin z}{\sin(z'+z)}$ — c der Collimationsfehler des Mittelfadens,

$F = \sec\varphi\,\frac{\sin z}{\sin(z'+z)}\,(\sec m)^k$ — f die Distanz des Mittelfadens von dem, an welchem der Polarstern beobachtet ist.

$k = 1+2\operatorname{cotg}\varphi^2+\frac{1}{\mu}$

Zur Bestimmung der Vorzeichen von c und f sei bemerkt, dass 90^0+c und 90^0+c+f die Entfernung des Punctes, in welchem die verlängerte westliche Achse des Instrumentes die Himmelskugel trifft, von dem beobachteten Stern während des Durchganges durch die betreffenden Fäden bedeutet.

Genäherte Rechnung.

Man berechnet

$$\operatorname{tg}\xi=\frac{\sec\delta\,\operatorname{cotg}\delta'\sin\tau}{1-\operatorname{tg}\delta\operatorname{cotg}\delta'\cos\tau}$$
$$\sin\eta=\frac{\sin f}{\sin(z'+z)}$$
$$\operatorname{tg} x_1=\sin\delta\,\operatorname{tg}(\xi+\eta)$$
$$\sin m_1=\cos\delta\,\operatorname{tg}(\xi+\eta)\,\operatorname{tg}\varphi\cos x_1$$

so wird

$$u=\left(\frac{x_1-m_1}{15}\right)-(D+Bb+c).$$

Passagen-Instrument im ersten Vertical.

Einstellung des Sterns.

Der Stundenwinkel t und die Zenithdistanz z eines Sternes während seines Durchgangs durch den ersten Vertical findet sich durch

$$\cos z = \frac{\sin \delta}{\sin \varphi}, \quad \cos (15\,t) = \frac{\operatorname{tg} \delta}{\operatorname{tg} \varphi},$$

$$\text{oder } \operatorname{tg} (15\,t) = \frac{\operatorname{tg} z}{\cos \varphi}.$$

Ist α die AR, so ist $\alpha - t$ die Sternzeit des Durchgangs durch den Ostvertical, und $\alpha + t$ die Sternzeit des Durchgangs durch den Westvertical.

Ist f die Entfernung eines Seitenfadens vom Mittelfaden in Zeitsecunden, T die Zeit des Antritts des Sterns an den Mittelfaden, z die dieser Zeit entsprechende Zenithdistanz, $T + \delta T$ die Zeit des Antritts des Sterns an den Seitenfaden, und $z + \delta z$ die entsprechende Zenithdistanz, so ist genähert

$$\delta T = \pm \frac{f}{\sin \varphi \sin z}; \quad \delta z = \pm 15 \cos \varphi \, \delta T.$$

Polhöhenbestimmung.

Ist T die Zeit der ersten, T' die der zweiten Beobachtung, und ΔU die Verspätung des Chronometers gegen Sternzeit im Laufe des Zeitraums $T' - T$, so erhält man, unter der Voraussetzung, dass das Instrument zwischen der ersten und zweiten Beobachtung in seinen Lagern umgelegt wurde, die Polhöhe φ aus folgenden Formeln:

$$\tfrac{1}{15}\, t = \tfrac{1}{2}\,(T' - T + \Delta U)$$

$$\operatorname{tg} \varphi' = \operatorname{tg} \delta \sec t,$$

$$\text{oder } \sin (\varphi' - \delta) = \sin \varphi' \cos \delta \,.\, 2 \,.\, \sin \tfrac{1}{2}\, t^2$$

$$\varphi = \varphi' + \tfrac{1}{2}\,(i' + i),$$

wo i und i' die beobachteten Neigungen der Achse zur Zeit der ersten und zweiten Beobachtung (bei nördlichen Polhöhen positiv genommen, wenn nördlich höher) bezeichnen.

Höhen-Instrumente.

Polhöhenbestimmung.

$$\operatorname{tg} N = \operatorname{tg} \delta \sec t$$

$$n = \frac{\sin \delta}{\sin N}$$

$$\cos (\varphi - N) = \frac{\cos z}{n}$$

Zeitbestimmung.

$$\operatorname{tg} \tfrac{1}{2} t^2 = \frac{\sin \frac{1}{2}(z - \varphi + \delta) \sin \frac{1}{2}(z + \varphi - \delta)}{\cos \frac{1}{2}(z + \varphi + \delta) \cos \frac{1}{2}(\varphi + \delta - z)}$$

Sternzeit (resp. wahre Sonnenzeit) $= t + \alpha$.

t ist positiv, wenn die Beobachtung im Westen, negativ, wenn sie im Osten gemacht ist.

Einige andere Reductionsformeln.

Tägliche Aberration ausser dem Meridian.

Bedeutet
α' die beobachtete AR,
α die wahre AR,
δ' die beobachtete Declination,
δ die wahre Declination,
τ den westlichen Stundenwinkel des Sterns,
$= \text{Sternzeit} - \text{AR}$,
ψ die geocentrische Polhöhe,
ϱ den Radius Vector, so ist

$$\alpha' - \alpha = 0''3110\, \varrho \cos\psi \cos\tau \sec\delta$$
$$\delta' - \delta = 0''3110\, \varrho \cos\psi \sin\tau \sin\delta.$$

Verwandlung von Azimuth und Zenithdistanz in Stundenwinkel und Declination.

A = Azimuth.

$$\sin\delta = \sin\varphi \cos z - \cos\varphi \sin z \cos A$$
$$\cos\delta \sin t = \sin z \sin A$$
$$\cos\delta \cos t = \cos z \cos\varphi + \sin z \sin\varphi \cos A.$$

Verwandlung von Stundenwinkel und Declination in Azimuth und Zenithdistanz.

$$\cos z = \sin\varphi \sin\delta + \cos\varphi \cos\delta \cos t$$
$$\sin z \sin A = \cos\delta \sin t$$
$$\sin z \cos A = -\cos\varphi \sin\delta + \sin\varphi \cos\delta \cos t.$$

Verwandlung von Stundenwinkel und Declination in Zenithdistanz und parallactischen Winkel.

$$\cos z = \sin\varphi \sin\delta + \cos\varphi \cos\delta \cos t$$
$$\sin z \sin p = \cos\varphi \sin t$$
$$\sin z \cos p = -\sin\varphi \cos\delta + \cos\varphi \sin\delta \cos t.$$

Herstellung einer Tafel zur Lösung der drei letzten Aufgaben für eine bestimmte Polhöhe.

Man berechnet für die Stundenwinkel von 0^h bis 6^h die Grössen A, B, $\log C$, $\log D$, $\log E$ aus folgenden Formeln:

$$\sin\varphi \operatorname{tg} t = \operatorname{tg} A$$
$$\operatorname{cotg}\varphi \cos t = \operatorname{tg} B$$
$$\sin B \operatorname{tg} t = \operatorname{cotg}\varphi \sin A = E = \operatorname{tg}\Theta$$
$$C = \sin\Theta$$
$$D = \cos\Theta.$$

Die Tafel wird in folgender Weise angewandt: Man rechnet Azimuth und Stundenwinkel vom Südpuncte aus nach der Seite hin, wo der Stern steht, so dass also beide nicht über 180° wachsen können. Alsdann wird, für die Verwandlung von Stundenwinkel und Declination in Höhe (h) und Azimuth (a):

$$C \operatorname{tg}(B+\delta) = \operatorname{tg} u,$$

$$D \sin(B+\delta) = \sin h, \text{ oder } \frac{\sin u}{E} = \operatorname{tg} h.$$

$$\text{Azimuth} = a = A + u.$$

Für die Verwandlung von Azimuth und Höhe in Stundenwinkel und Declination braucht man als Argument der Tafel, nicht wie vorher, den Stundenwinkel, sondern das in Zeit verwandelte Azimuth. Alsdann wird

$$C \operatorname{tg}(h-B) = \operatorname{tg} u,$$

$$D \sin(h-B) = \sin\delta \text{ oder } \frac{\sin u}{E} = \operatorname{tg}\delta,$$

$$t = A - u.$$

Zur Verwandlung von Stundenwinkel und Declination in Zenithdistanz nnd parallactischen Winkel dienen die Formeln:

$$\frac{E}{\cos(B+\delta)} = \operatorname{tg} p,$$

$$\operatorname{cotg}(B+\delta)\sec p = \operatorname{tg} z.$$

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